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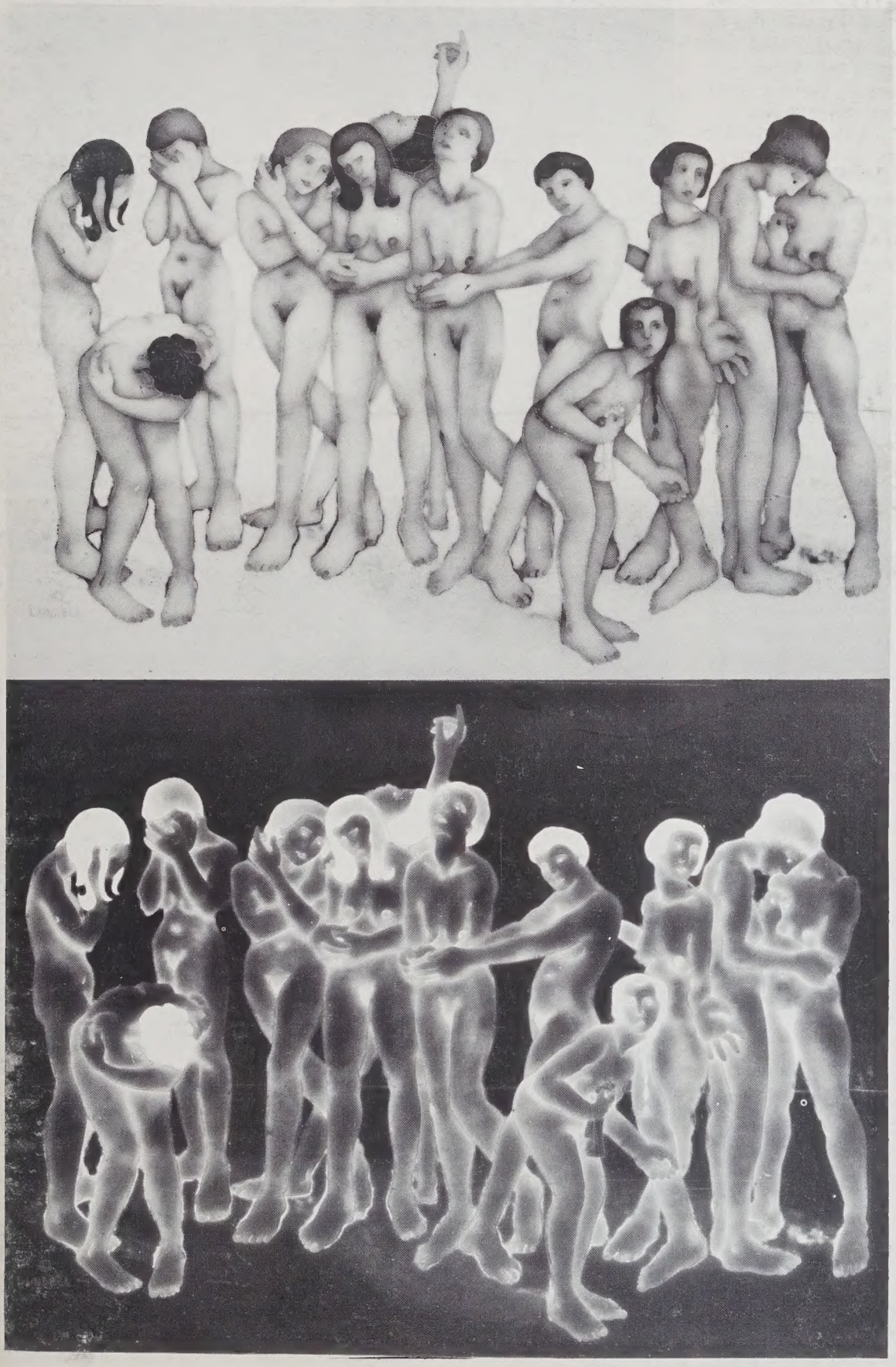


Linda Lundell, "The Builders No. IV", cloisonne enamel, 45.8 cm

Linda Lundell, "The Builders No. IV", cloisonne enamel (photo negative reversal)

CALIFORNIA METALS INVITATIONAL

REVIEWS

EXHIBITION REVIEWS

CALIFORNIA METALS INVITATIONAL

by Robert Barrett

CALIFORNIA METALS INVITATIONAL

Marilyn Ravanal, "Coqueteo hair ornament", sterling and fine silver, 14k gold, quartz, moonstone, and plexiglass, 12.8 cm h

Arline Fisch, "Elephant Walk Brooch", sterling, copper, agate and ivory, 8.9 m w

The California Metals Invitational exhibit, sponsored by the Long Beach Recreation Commission, was held in the Long Beach Gallery from July 7 to July 28, 1978.

According to curators, Lotte Cherin and Kathleen Fargo, the purpose of this exhibit was to bring together a collection that represented the best of small fine metalwork presently being made in California, and to enrich the esthetic experience of the Southern California art audience. To ensure this goal 15 artists were invited to participate. These artists were: Teri Brudnak-Luddy, Patricia Caufield, Arline Fisch, Ralph Hacker, Marcia Lewis, Randy Long, Linda Lundell, Irene Mori, Dieter Muller-Stach, Alvin Pine, Svetozar Radakovitch, Marilyn Ravanal, Hal Ross, Kay Yee, and Anthony Lugo. The invited artists were selected because of their notoriety or because their work represented an aspect of fine metalwork that needed to be included in a comprehensive exhibit.

Twenty-six additional pieces were juried into the show by Lynda Watson from entries submitted from all areas of California. Ms. Watson, a resident of Santa Cruz, CA, and a 1977-78 recipient of a National Endowment of the Arts Individual Craftsmen's Grant, was requested by the curators to include two pieces of her own work in the show.

The exhibit, elegantly presented by Cherin and Fargo, was noteworthy not only for quality of the work but also for the care that was taken to ensure that each piece was presented to its maximum advantage. Using black cubes and white plaster of paris pillows, custom made for individual pieces as bases, the entire show seemed to float in the darkened gallery allowing for an intimate and dramatic viewing environment.

Cash prizes totaling $1,000 were equally divided by Ms. Watson and awarded to Ruth Furhmann of San Diego, Brigid O'Hanrahan of San Diego, Randy Long of San Diego, Marilyn Ravanal of Long Beach, and Kay Yee of Santa Cruz. A $500 purchase prize, anonymously donated by a Long Beach patron, was awarded to Irene Mori of Huntington Beach for her sterling silver and crystal brooch entitled "Transformer".

This well-attended exhibition also drew capacity crowds at the opening reception which included many of the artists, Ms. Watson, juror of the exhibit Bernard Kestor, critic for *Crafts' Horizon*, and Ann Robins of the Los Angeles Folk Art Museum.

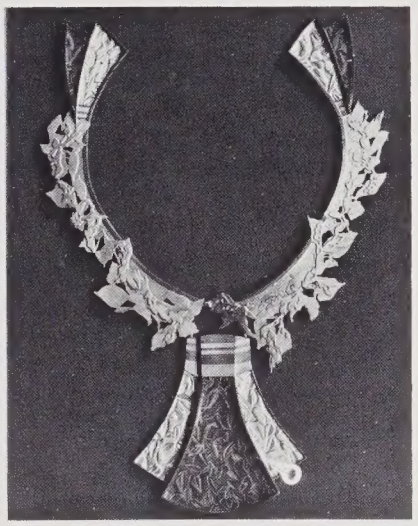
Linda Lundell, Chalice, fine and sterling silver, enamel and 14k gold

FIRST JEWELRY INVITATIONAL
California State University at Fresno

by Ed Lund

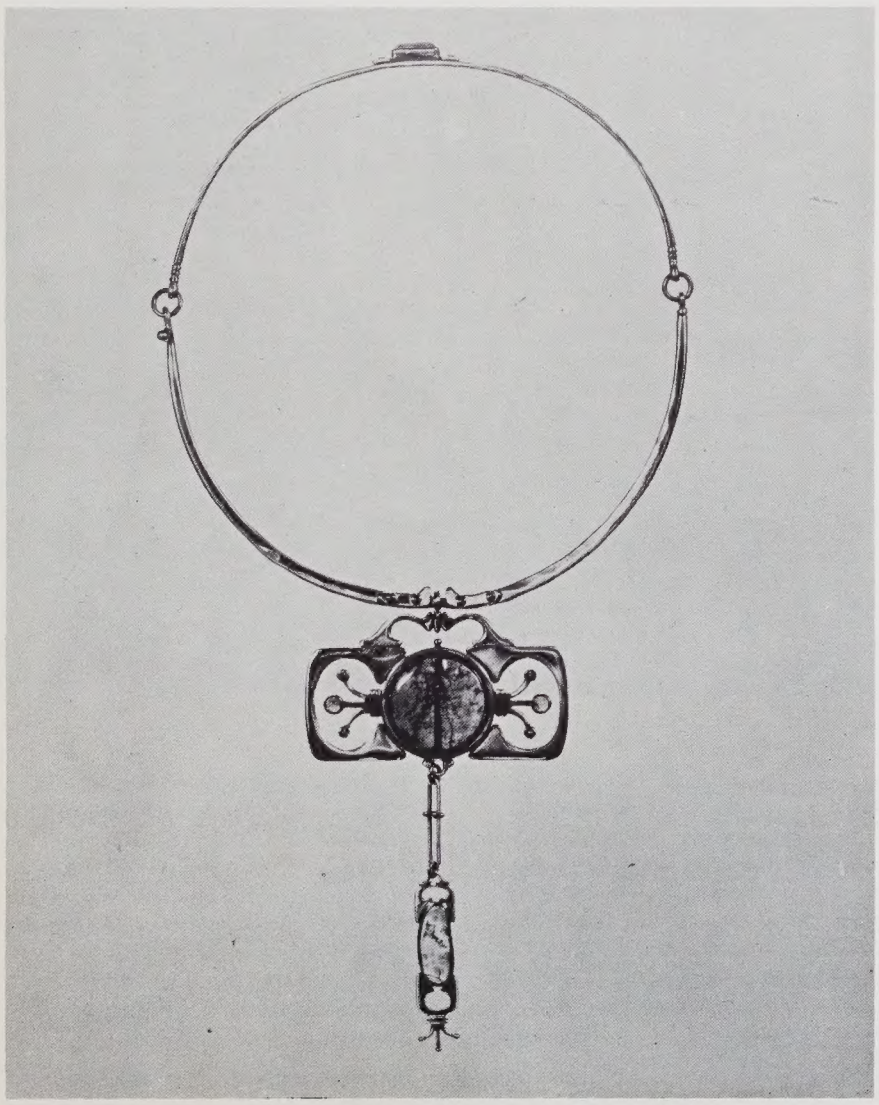
The first invitational jewelry and metalsmithing exhibition was intended to acquaint the university community and metropolitan Fresno with a relatively smaller but patent spectrum of contemporary jewelry design and metalsmithing in California today. The participating artists are well-known and respected professionals on the state and national level who's work, while expressing diverse points of view, have as a common denominator the "pursuite of excellence."

The artists included SNAG members: Al Pine, Marc Paisin, David LaPlantz, Helen Shirk, Douglas Steakley, Arline Fisch, Florence Resnikoff, Merry Renk, Lynda Watson, Marcia Lewis, and Al Ching. Arthur Korb also was included.



Arthur Korb, Neckpiece, sterling, 18k & 24k gold, agate and amethyst

Lynda Watson, "Bellflower Neckpiece", fine & sterling silver, copper and polyester, approx. 10" h



RINGS
by Brian Beaumont-Nesbitt

One thousand finger-rings were displayed at Goldsmiths Hall from July 5 to 28, in the finest survey of historical rings ever exhibited anywhere in the world.

The exhibition, which has a second showing at the Ashmolean Museum in Oxford from August 5 to September 17, was initiated by Diana Scarisbrick and is organised by Gerald Taylor, senior Assistant Keeper at the Ashmolean.

ROYAL LOANS—H.M. The Queen lent two engraved diamond rings presented to Queen Victoria for her Jubilee in 1887, and additional rings worn by other historical figures from William of Wykeham to Thomas Gainsborough.

Most of the finest rings were chosen from two great collections, one bequeathed by Drury Fortnum to the Ashmolean and the other presented to the British Museum or the Victoria & Albert Museum by Dame Joan Evans. Both her father Sir John Evans the Anglo-Saxon specialist and her half-brother Sir Arthur Evans, the archaeologist who was also Keeper of the Ashmolean, collected rings and she herself was a noted jewellery historian with a special interest in mediaeval rings.

The Rings exhibition includes scarabs and historical rings, amuletic and religious rings, rings which symbolise authority, rings for love or lust—and rings worn purely for pleasure. There are Egyptian, Greek, Hellenistic and Roman rings; rings from the Dark Ages and the Middle Ages; 15th century nielloed and 16th century enamelled rings; gold signet rings from the 17th century; Georgian and Regency mourning rings; and modern rings from the 1960's and 1970's.

(top center—clockwise) Andrew Grima, 18k with diamonds & turquoise; Wendy Ramshaw, gold with agate & enamel; Gerda Flockinger, gold with opal; David Thomas, 18k with diamonds; Charlotte de Syllas, silver & gold with diamond and niello; Ernest Blyth, tourmaline with diamonds; (center) Gerda Flockinger, silver with enamel

Heikki Seppa, Sterling Sculpture

"RATTLESNAKES" EXHIBITION REVIEW

by Paulette Myers

This summer marked a very fine and unique exhibition in London, England, sponsored by the Worshipful Company of Goldsmiths. From July 5 to July 28, the work of four American metalsmiths was on view at Goldsmiths Hall. The exhibit, entitled "Rattlesnakes," featured Heikki Seppa, Mary Lee Hu, William Harper and Mary Ann Scherr. Up to this time, Graham Hughes, exhibition director at Goldsmiths Hall, stated that only one other previous exhibition at the Hall had featured an American, namely jeweler Henry Shawak of Boston, in 1970.

Through Mr. Hughes' initial suggestion for the exhibit, the idea was launched with the joint effort of Graham Hughes and Joseph Ordos, associate professor of design at the University of Minnesota, Minneapolis. "Rattlesnakes" transpired somewhat as a counterpart to the exhibition "Loot", featuring contemporary British goldsmiths, which was shown this year at Minneapolis, MN.

"Rattlesnakes" was a definite success. It was shown along with an exhibition entitled "Rings," featuring finger rings from ancient Egypt to the present day. These exhibits were reviewed by 3,786 individuals not including many groups attending.

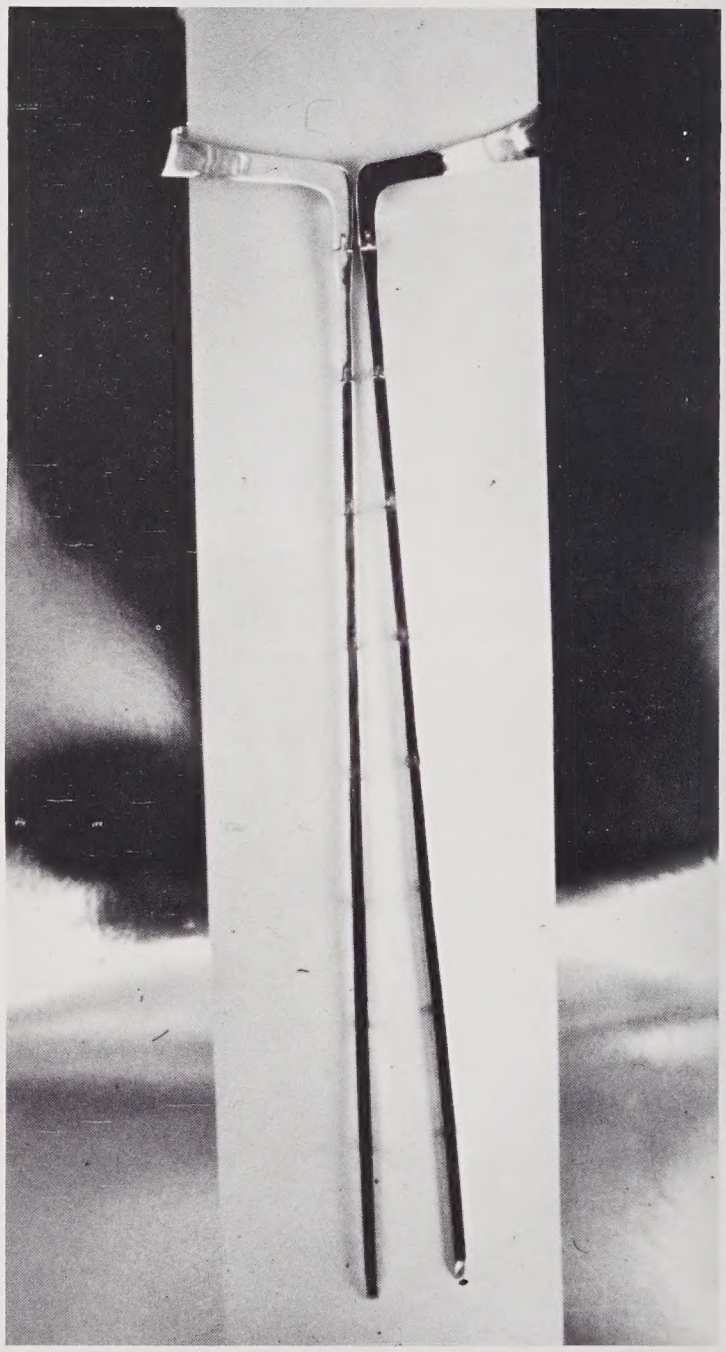
The work of these four metalsmiths represented contemporary directions in America very well with their varied concepts and techniques. To quote Mr. Hughes' commentary in the exhibition catalog, "The American work is obviously much larger than ours; the power of the designs would be most unsuitable to render on a miniature scale, so would the techniques."

For example, Heikki Seppa exhibited his large sculptural volumetrics. These swelling and tapering forms powerfully move in space. He contrasted mirrored surface finishes with the textured areas of reticulation, engraving or perforation. Silver dominated with accents of gold, oxidized silver, and stones. A master of metal forming, Heikki repeatedly makes use of multishell structures.

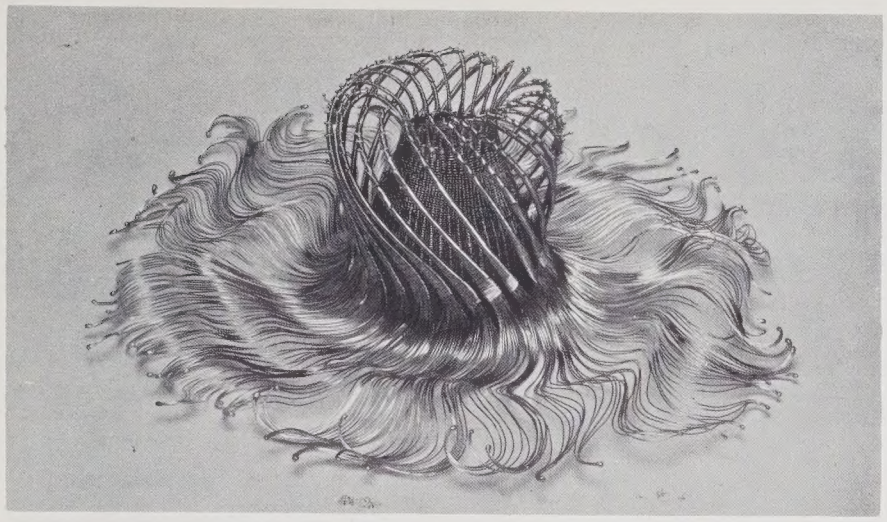
Mary Lee Hu exhibited her elegant and fluid woven metal jewelry and other objects. The directional movement she achieves is very fluid and wavelike with the contoured woven shapes, wrapped wires, singular parallel lines joining at their tips. Some undulate in wavelike formation such as "Form No. 3" resulting in almost a hypnotic power. Silver predominates in most pieces while very controlled colored wire is interwoven in some.

William Harper's enamels carry their mystic and ritualistic qualities. Their magical and primitive nature is emphasized by the juxtaposition of precious and non-precious materials. He sets bright, rich 24 karat gold cloisonne wires or fine silver wires against rattlesnake skin, sea shells, and bettle shells which was a symbolic spiritual image used in Egyptian jewelry. The precious and non-precious reach great unity in the effective use of enamel color interplay, intense with more subdued color either in cool or warm hues. These "non-precious" materials therefore become as precious, unique, and rare as the gold itself.

Mary Ann Scherr represents contemporary concerns in technological advancement. Mary Ann's heart pulse sensor bracelet involves the monitoring of the heart beat not to exceed a predetermined pulse rate. Oxygen supply and alarm system are housed in such jewelry. In addition to the medical concerns, she exhibited other jewelry very frontal and symmetrical with their articulating parts. Highly polished silver is joined with ivory, plastic feathers, bone, hair and stones.



Congratulations to the four exhibitors. Congratulations also to Graham Hughes and Joseph Ordos for their interest and high quality efforts. Mr. Hughes stated that he forsees this exhibit as the beginning of American metal showing in England. I am sure that such exhibitions as "Loot" will be also increased in the future in America.



Mary Lee Hu, "Form No. 3", fine and sterling silver, lacquered copper & nickel alloy, 6" h x 18", 1977

RATTLESNAKES
(exhibition of modern American jewellery at Goldsmiths' Hall, London, July 5-28, 1978)

by Graham Hughes

Mary Ann Scherr, "Ribbons", sterling with lapis (left)

William Harper, "Mystery Pendant", gold & silver cloisonne enamel on copper, 14k gold, sterling, bronze and pearls; 1978

Modern American painting is famous and much admired in England, whereas modern American jewellers are still almost unknown. We hope this small sampling will help to introduce the British public to an exciting trans-Atlantic achievement.

Each of these jewellers has an unmistakable personal idiom; each different from the other, and all of them showing a complete change of vision from their European colleagues.

The American work is obviously much larger than ours; the powerful designs would mostly be unsuitable to render on a miniature scale, so would the techniques. William Harper's magnificent cloisonne enamel, and natural materials like rattlesnake rattles, beetle shells, chipmunk teeth and hair, all found in his Florida countryside, need to be seen bold, as medieval enamels used to be. Mary Lee Hu's weaving would likewise be meaningless if its rhythms were not large and clear. Mary Ann Scherr came to jewellery through medicine. Her pieces often have a medical use, for instance concealing emergency pressurized oxygen, and that needs big scale which in turn leads to her confident approach. Heikki Seppa moved away from the self-critical restraint characteristic of his Scandinavian origin, and now thinks more of mass and sculpture than of pretty decoration.

These big pieces from a great continent should be a refreshing contrast to "Rings" in the next door gallery at Goldsmiths' Hall — probably the most splendid collection of thousands of years of finger rings ever shown together anywhere. The imaginative freedom of American art, using technique but never dominated by it, will be a stimulant to European designers and a pleasure to the many patrons who are promoting modern jewellery into a respected art form.

The Craft Committee of the Worshipful Company of Goldsmiths is grateful to Joseph Ordos, Associate Professor of Design at the University of Minnesota and himself a jeweller, for selecting, assembling and bringing over this outstanding group. We thank the artists too, for lending us some of the most original work they have made in recent years. It is a pleasure to house "Rattlesnakes" at the Hall, to reciprocate in part the generosity of the Minneapolis Institute of Arts, which is now presenting our British "Loot" exhibition for the first time to the U.S. public.

(NOTE: Under the British Hall-marking Act 1973, which the Company helps to enforce, articles made partly of precious metal and partly of base metal cannot be hall-marked, and consequently may not be described in the course of a trade or business as consisting partly of gold, silver and platinum.

Some of these exhibits therefore could not be offered for sale in Britain, with their present description.)

"LOOT"
(Organized by the Worshipful Company of Goldsmiths — Exhibited at Minneapolis Institute of Arts)
(courtesy of Worshipful Company of Goldsmiths, London, England)

by Graham Hughes

"Loot" is a selection of new jewels and silver handcrafted by young British artists. The name suggests endless riches coupled with the lure of getting something for nothing, and that is almost what the exhibition tries to offer. There is great variety in type and size. Many of these craftsmen's pieces are very cheap, mingling with some fine masterpieces using all sorts of metals and stones. There are some 750 exhibits from about 170 small workshops throughout the British Isles and they can all be ordered for sale.

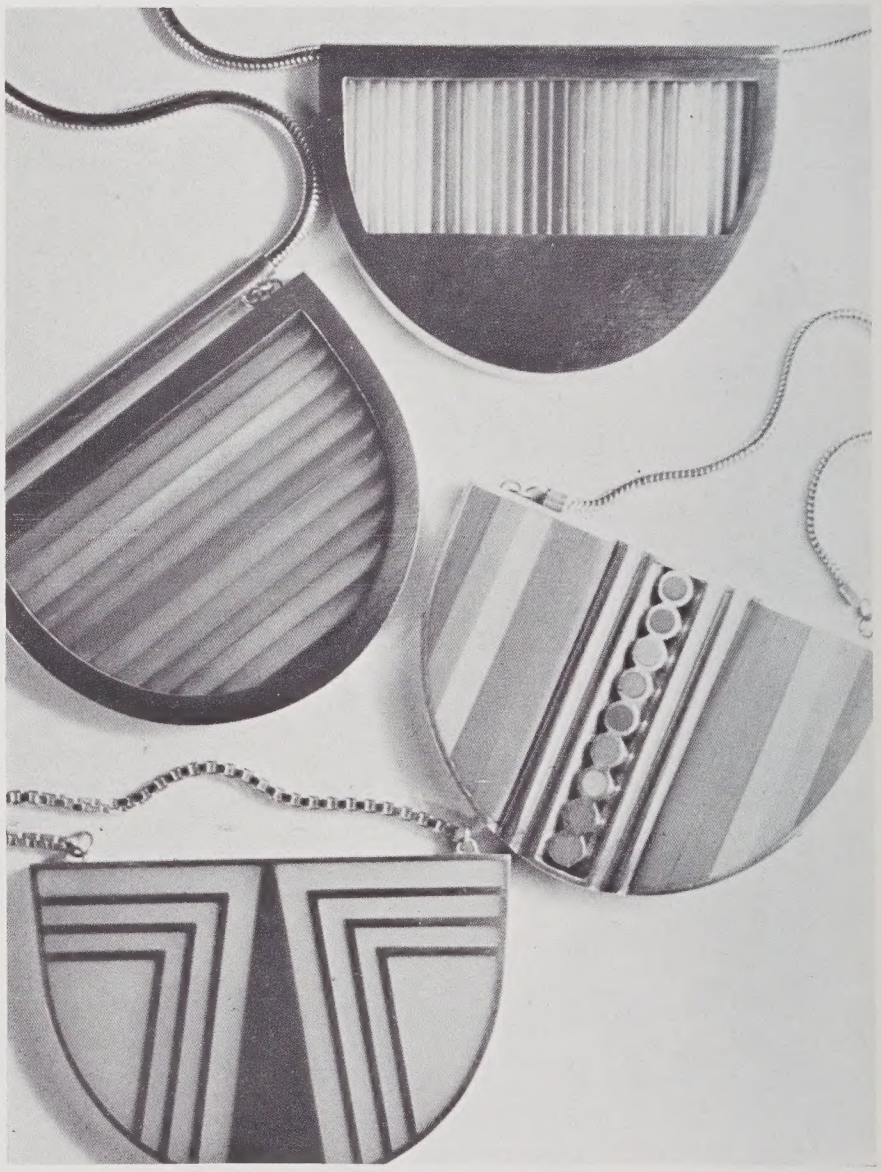
"Loot" has been shown three years, running at Goldsmith's Hall, London, always with great success. A large and mixed public have each time placed business at "Loot," often enabling young craftsmen to establish their new careers. A little encouragement at the beginning of their professional life is what the exhibition tries to provide, and it has often made the difference between success and failure. For some it is indeed their first public exhibition, and what an exciting opportunity for them the Kresge Gallery represents. Minneapolis is the first big overseas showing, an adventure in transatlantic partnership between the Institute of Arts and the Worshipful Company of Goldsmiths, London's guild of goldsmiths, silversmiths and jewellers. It is a compliment to British artists to be invited to such a great museum and we hope the American public in Minneapolis will support this generous international initiative of the Institute.

The British background to "Loot" is quite startling. In recent decades there has been an unparalleled upsurge of activity in British silver and jewels, no doubt partly because of the Company's steady patronage. Whereas thirty years ago, good creative metal-workers could be numbered only by the dozen, there are now hundreds. To some extent this increase in small workshops has been offset by the closing of bigger factories but that is only part of the story. There has in Britain been a real change in public appetites. The way of life of hand craftsmen is becoming more popular everywhere; most of the larger towns in the U.K. have at least one craft boutique or gallery; crafts play a prominent part in the various British government schemes for encouraging modern art through museums, regional art associations and information services. So, whilst the independent craftsmen will never have ease, they can now look forward, if not to a rosy future, at least to a useful life.

Most of the exhibitors are young and almost unknown, but some are from established workshops. One of these is Stuart Devlin, master silversmith, who came to London from Australia to enjoy, and to contribute to, the lively scene of British silversmithing. He is nowadays continually on the move across the Atlantic and the Pacific to visit the family of his American wife, Kim, to execute the fine commissions he still receives from his home country, Australia, for instance for coins and for ceremonial Government badges and medals, and to relax in his home on the tiny island of Mustique. His "Loot" exhibits show his characteristic use of modern filigree ornament — wires soldered by his personal modern technique to form exciting patterns. Grant Macdonald runs another skilled London workshop specialising, in his case, in electro-texturing, the creation of decoration by the electro deposition of metal on to a wax form. Malcolm Appleby, one of Europe's finest engravers, by contrast, works only by hand in a remote disused railway station in the North of Scotland.

Amongst the jewellers, many individual styles can be seen, the product both of personal imagination and of new techniques. Edward DeLarge has pioneered a fascinating treatment of the hard metal titanium, which has come into use for jewellery only in the past decade; his architectural fantasies jump out at you, or run away and change their colours according to your angle of view. Graham Crimmins of Edinburgh offers a more relaxed landscape vision made from similar materials. Under heat, titanium changes colour through the whole range of blue/mauve/purple/red/grey, the heat being applied either by electric current or by flame.

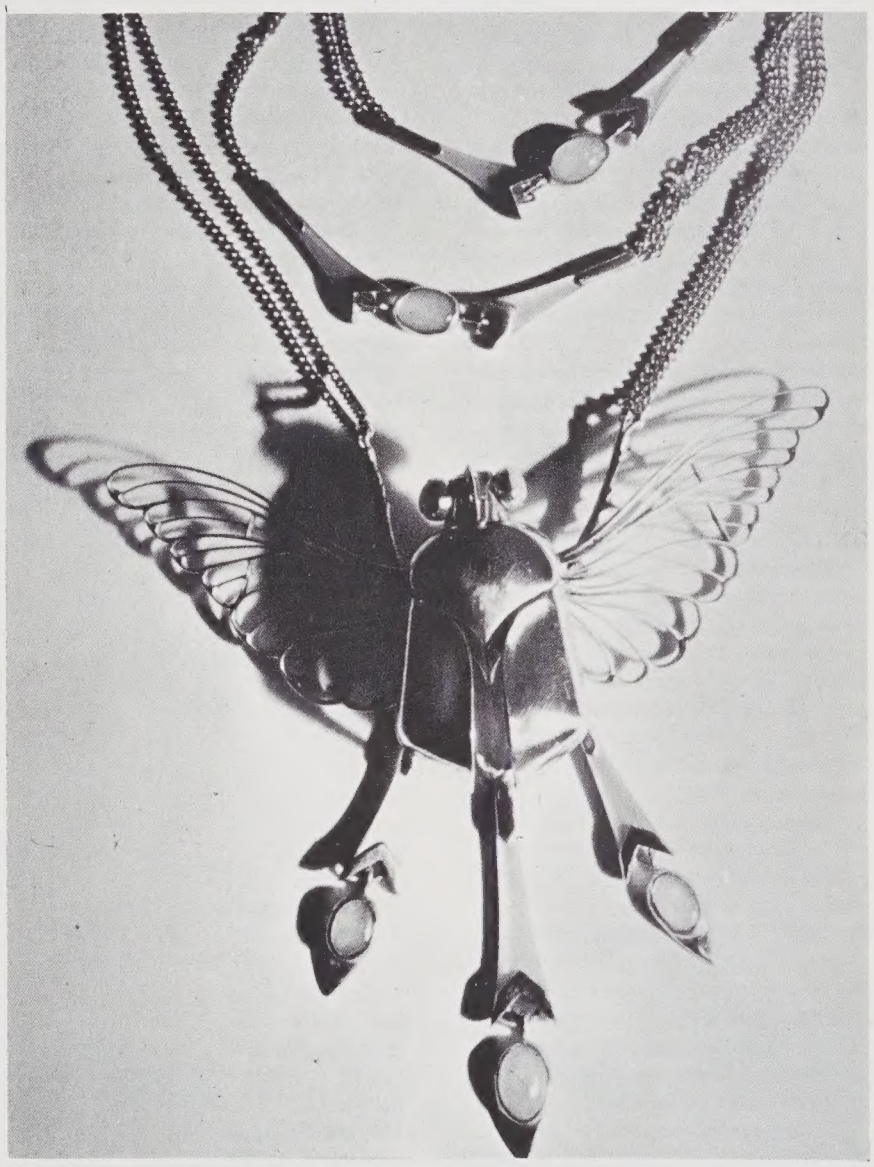
Niobium is another of these rare refractory metals, each of which has its own exotic colour potential. Susan Clarke has challenged this, one of the hardest. Ann-Marie Shillito shows the potential of tantalum. These metals are almost impossible to solder, so the artists have reverted to the ancient form of joining by rivets, as was used for instance by the Incas and before, in South America, when they could not make a hot enough local flame to solder effectively.



Nichola Fletcher, necklaces, silver and plexiglass

Marilyn Nicholson, brooches and necklaces, silver and agate

David Courts & Bill Hackett, "flying beetle necklace," opals and mother-of pearls



Resin is another old material newly introduced to jewels: a treacly substance, you can mix it to any colour you choose and Patricia Miles has produced some startling results. Many artists use mass produced components to bring down the cost, but in an original way to give new vitality: Nichola Fletcher working in Auchtermuchty, a village in the South East of Scotland so pretty it could easily itself be a jewel, has designed an exciting new frame shape for her tubes and bars of plastic.

Caroline Broadhead, working in the shadow of the Royal Opera House, Covent Garden, London, winds her cotton jewels by hand and we know they will last forever; like coptic hangings from Egypt, the more you wash them, the more mellow the colours become.

Bill Courts and David Hackett show the true renaissance spirit: they use the most exotic metals, and stones of a traditional nature and they put them together with exquisite care in their own personal formation. Like many good artists they are obsessed with their own personal theme, which is insects and seeds: they take a wonderful artefact of nature, and magnify it. Marilynn Nicholson, (herself one of America's best exports to U.K.) uses perhaps the oldest choice of all: agate, the favourite for Mesopotamian jewellers in Sumeria and Babylon 5,000 years ago. She uncovers new marvels for us in this ancient world of mineral mystery. . .

Many "Loot" exhibitors have benefited from the travel scholarships we give at 19 art schools. We have helped to build 11 treasuries to show plate in British cathedrals. We find about two dozen apprentices every year for their four or five year training, after which they become Freemen of the Company. We maintain a library of books and photographs of the craft and we have a research programme to feed technology into our workshops. Through our exhibitions, both at home and overseas, we try to summarise important metalwork developments, old and new. Always, as in "Loot," we try to help good craftsmen to sell their work because without sales quality cannot survive. . . .

Anglo-American friendship is perpetually self-renewing. We believe that "Loot" in Minneapolis will prove a milestone in this historic evolution.

ANN ARBOR STREET FAIR

by Pat Garrett

Recently I received a letter suggesting I write a humorous account of the Ann Arbor Street Art Fair, 1978. However, this was one of those events that when over, people say, "We'll look back at this and laugh." I have not reached such a high level of philosophical perspective yet!

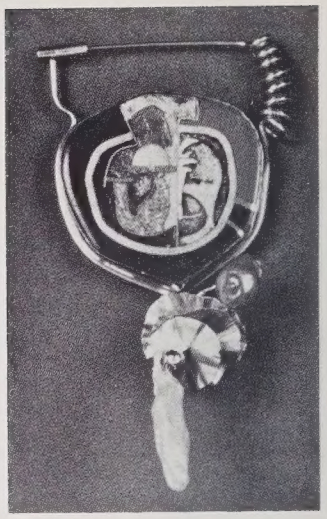
The Ann Arbor Fair is incredible—always taking place on the four hottest, muggiest days of the year. This year was no exception, yet definitely worse. The weather highlight was a thunderstorm boasting 60 mph gusts that ripped roofs off booths, threw 1x2's with nails maliciously into the crowds, broke 2x4's and whisked Thomas Mann's entire set up onto a pole 20 feet away. The storm did add drama however, no one was hurt and Tom was able to salvage enough to be back in business that evening.

And the people attended (250,000 according to the Ann Arbor News). One wonders how many had to leave their cars in Toledo, as it's hard to park anywhere near by 9 a.m. Anyway, these persistent souls scoured booth after booth, trying hard to make purchase decisions. That in itself is remarkable as three fairs run concurrently: The Ann Arbor Street Art Fair (juried), the Summer Arts Festival, and the State Street Fair. Sales were good though, despite 1,000 booth people trying to sell their crafts — mixed with a number of "illegal" street vendors, flaunting through body wear/ware.

The jewelry in this year's street fair was unusually good and prompted the following remark from the Ann Arbor News: ". . . it is interesting that this very demanding field has attracted so many good designers and meticulous craftsmen." Those craftsPEOPLE were: Pamela Allman, Fumi Ankrum, Lynne Bennett, Robert Bruya, Allen Bryan, Bob Christiansen, Suzanne Cruise, Lee Curtin, Amanda and Tom DeWitt, David Edelstein, Bill Fiorini, Chris Gabel, Hannelore Gabriel, Pat Garret, Lynne Gearhart, Susannah Pierce Gillies, David Henne, Fred Hunter, John Jauquet, Ann Krupp, Mary Ann Nibbelink, Frank Parkel, Thomas Mann, Lee Peck, Ken Schmidt, James Stahl, Pat Stinson, Becky Stoinoff and David Vinson.

SOUTHEAST CRAFTS '78
ACC SOUTHEAST REGION

Berea College Art Gallery



William Harper, "Mystery Pin No. 4", gold, silver, copper, enamel and pearls (top)

Marlene Byer, bowl, enamel

Robert Griffith, door latch, iron (bottom)

In late 1977 Southeast craftsmen were asked to submit slides of recent works (from 5 to 20) for initial screening. Those selected in this screening were asked to submit objects for final jurying, done May 1, 1978. Awards are all merit; no categories were pre-defined, and no "bests" were included.

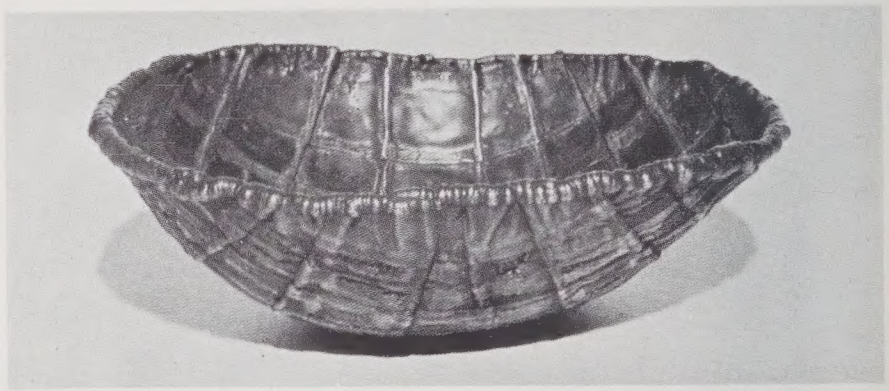
JUROR'S STATEMENT

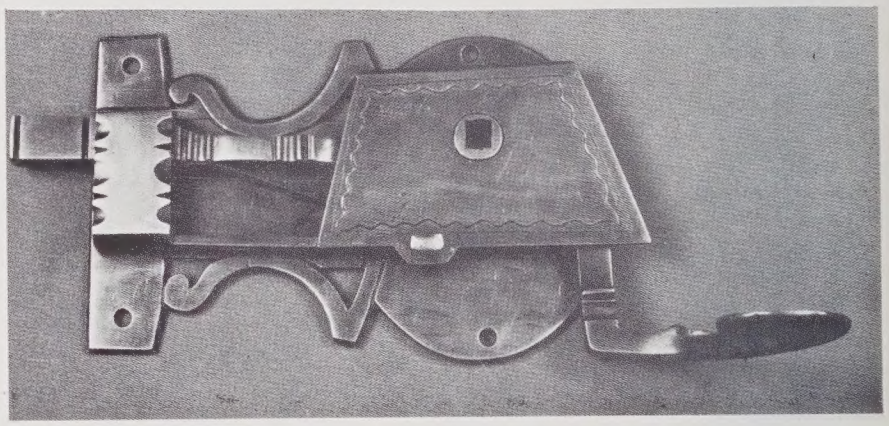
(Juror: Lloyd E. Herman, Director, The Renwick Gallery, The National Collection of Fine Arts, The Smithsonian Institution, Washington, DC)

Jurying by slides is always a tricky business; they can lie, causing a juror to accept or reject a craftmaker's work on false grounds. When I was invited to select objects for "Southeast Crafts '78," I welcomed the opportunity to make an initial selection of entrants from slides and a final choice for exhibition from actual objects sent in by those whose slides were accepted. Unfortunately there are always those craftspeople whose objects do not show to advantage in slides and were eliminated initially, and those whose work was omitted in the first review for the sake of the exhibition's consistency. After all, an exhibition can consist of only so many objects in a certain space, and should reflect as much as possible the variety of quality works that will look good together. Unlike selecting craftsmen for a fair or festival when a body of their work will be seen and no attention must be given to how each person's work looks with the others, an exhibition should be planned so that the selection of objects and their presentation is sympathetic.

From slides submitted by more than 200 craftmakers in the region I selected 87 to submit actual objects for judging in Berea. Eighty-two of those selected actually sent pieces — some of them the two objects permitted. From those, 65 objects by 46 craftmakers were chosen for the show.

It might be expected that a region with eleven states would represent virtually all craft media in a variety of styles. In clay that was true; there were strong entries submitted by clay craftsmen producing utilitarian vessel forms as well as those making "statement" pieces.





The fiber entries were as strong as those in clay. as can usually be predicted in these two popular media. . .

What was surprising was the nearly-total absence of distinctive work in metal. Of several individuals selected from slide entries only two were chosen for the exhibition: William Harper, whose excellent metal work is sublimated to the richness of his cloisonne enamel and the objects he incorporates in his work, and Robert Griffith, who has made a silver pastry tool, and a door-latch of some distinction in steel. Other objects accepted from slide entries because of their design quality — about all you can tell from slides — were eliminated because of flawed workmanship . . .

However, I did expect to find more entries from those who make simple furniture and decorative accessories of original design, and was disappointed by the small number of entries. It is unfortunate that many creative craftmakers have become discouraged by the ordeal of getting good photographs taken of their work, and the other nuisances of entry forms and fees, packing and delivery, which competitions require. Although I am glad that many needn't depent on exhibitions and fairs to acquaint consumers with their work, their participation could enliven exhibitions by offering a greater range of well-make designs.

That minor complaint made, the pieces chosen from a wider variety and larger quantity of work submitted for examination show that craftmakers in the southeastern states are making objects that are well designed, with their mastery of techniques serving them well in realizing their creative ideas.

MERIT AWARDS included: Robert Griffith, Duncanville, AL, $300; and William Harper, Tallahassee, FL, $300.

TECHNICAL INFORMATION

SILVER INSTITUTE PUBLISHES TECHNICAL SILVER SUMMARIES

The Silver Institute studies more than 275 reports each month of new research done throughout the world on silver and silver products. Four times a year, the Silver Institute presents about 70 of these reports in a publication called New Silver Technology. These presentations are not simply abstract references, but each item is intended to be a readable summary of the new technology which has been developed. The names of those who did the work and the full addresses, showing where the work was done or reported, are also provided, as well as the patent designations, or the issue and page designations for the technical publications carrying the texts of the reports.

Goldsmiths Journal has selected ten of these summaries and are reprinting them with permission of the Silver Institute, Suite 1138, 1001 Connecticut Ave., N.W., Washington, DC 20036. We felt these ten were the most interesting, wide-ranging, and potentially applicable. Subscription to the New Silver Technology is available from the Silver Institute at $25 per year. Members finding these reports particularly interesting should subscribe directly to the Institute to insure a complete and uninterrupted supply of summaries.

SILVER COLOR PROOF COIN OR MEDAL AND METHOD OF MAKING THE SAME

The surface of a coin blank made from an alloy containing 50% silver and 50% copper is somewhat rose-colored due to the presence of copper. A special electrolytic etching process removes copper from the surface of this coin blank so that the coin will have a luster similar to sterling silver.

This electrolytic etching is particularly desirable since a coin blank thus treated can be minted with a proof finish. This finish can be obtained since a specific amount of copper is removed in a given time by a controllable current density. The surface of a proof coin is characterized by its smoothness, its lack of grain, and its high luster.

The electrolytic etching process can be used in the minting of attractive coins, medals, or medallions. Coin blanks punched out of a sheet of 50% silver-50% copper alloy are rimmed and then annealed at 746C (1375F). This is 24C (75F) below the melting point of the alloy.

Electrolytic etching takes place in a sulphuric acid electrolyte with each coin blank serving as an anode. Current is applied for about 2 minutes at a current density of approximately 15 amperes per square foot (about 161 amperes per square meter) and a charge density of about 1800 coulombs per square foot (about 19,000 coulombs per square meter). Ten milligrams of copper is etched from the surface of a blank measuring approximately 3/32 of an inch (about 2.4 millimeters) in thickness and 1½ inches (38.2 millimeters) in diameter.

Subsequent burnishing removes any evidence of etching and leaves the blank shiny and clean. The blank can then be coined by the same process which is used for sterling silver coins. More than 2200 of the electrolytically etched blanks are coined without being blemished by flow marks whereas flow marks appear after the minting of only a very few chemically etched blanks. (In English)

James W. Simpson, Andrew Cosgarea, Jr., and Richard D. Bankert
Franklin Mint Corp., Franklin Center, PA 19091
United States Patent 4,063,346
December 20, 1977

DIRECT ELECTROPLATING ON ALUMINUM

A novel process for electroplating silver onto aluminum is particularly applicable to the manufacture of bus bars, switch gear assemblies, and electronic components. The silver plate provides these materials with good solderability and low contact resistance.

A surface of cleaned aluminum is electrochemically converted to a meta-stable state by a highly acidic, proprietary solution. This activation of the aluminum surface makes it possible to electroplate the silver directly onto the aluminum. Subsequent heat treatment at 104C (220F) converts the meta-stable aluminum to metallic aluminum and forms a strong bond between the silver and the aluminum. The proprietary solution is CP Chemicals PACO No. 2.

Many conventional electroplating processes, by contrast, require that the aluminum surface be activated by a low melting metal such as zinc or tin. By avoiding these low melting metals it is possible to use the silver plated aluminum at temperatures up to the fusion point of aluminum without risk of blistering or flaking.

An electrolytic brush technique is used to apply the proprietary activating solution. The "brush" is a carbon strip covered with a Dacron sleeve which can become saturated with activating solution. This brush is connected to the cathode of a 9 volt rectifier while the aluminum to be plated is connected to the anode. Rubbing of the saturated brush on the aluminum gives a uniformly gray colored activated surface, with a coating of aluminum hydride.

Silver can be electroplated on the thus activated aluminum, using a conventional silver cyanide bath. The brush plating technique used for application of the pretreatment solution can also be used to advantage for the silver plating since this technique permits selective application of the silver. A silver thickness of 50 microns (2 mils) is recommended for electronic components which will be exposed to high humidity.
A. Wasserman
CP Chemicals Inc., Arbor St., Sewaren, NJ 07077
Products Finishing, 1978, volume 42, issue 5, pages 48-50 and 52

ELECTROLYTIC COLORING OF ALUMINUM SURFACES

A solution of silver sulfate (Ag_2SO_4) in sulfuric acid (H_2SO_4) is used to electrolytically deposit a uniform yellow coating on aluminum. The plating current desired for this process consists of a combination of direct current and partially rectified alternating current.

An aluminum plate is first washed for 90 seconds at 60C (140F) with a 5% sodium hydroxide (NaOH) solution. The aluminum surface is then treated with nitric acid at room temperature (20C, 68F).

Electrolytic deposition of the yellow coat from the silver sulfate solution requires 3 minutes at room temperature. The plating bath is a 15% sulfuric acid (H_2SO_4) solution which contains 0.8 gram per liter of silver sulfate. For best results the plating current density is composed of 0.2 ampere per square decimeter (1.9 amperes per square foot) of alternating current and 0.4 ampere per square decimeter (3.7 amperes per square foot) of direct current. (In Japanese)

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Japanese Patent 78 03,327
February 6, 1978

HIGH STRENGTH STERLING SILVER FOR FLATWARE — A FEASIBILITY STUDY

The cost of sterling silver flatware is highly dependent on the amount of metal in the pieces. It has frequently been necessary to design machine-made sterlingware so that it is relatively thick so as to provide the necessary mechanical strength.

The thickness requirement of the conventionally used 92.5% silver — 7.5% copper sterling silver alloy, and hence the amount of metal required, could be reduced if a stronger alternative sterling silver alloy could be found. The resulting less costly pieces of silverware could apparently then be sold to a much larger market. By maintaining the silver content at 92.5% or higher, the alternative alloy could legally be designated as sterling.

An alloy containing 92.5% silver, 6.5% copper, and 1.0% aluminum, for instance, is much stronger than the conventional 92.5% silver—7.5% copper sterling silver. It is suggested that this alloy with the aluminum inclusion might serve as a prototype for developing the desired high strength sterling silver for use in the proposed less costly flatware. Such an improved alloy should resemble sterling silver in color and luster. Moreover, it would be desirable if the strengthened alloy could be worked and formed by the same flatware manufacturing techniques as are presently used for conventional sterling silver. It is proposed that the search for a stronger sterling silver might be extended by investigating the effect of adding tin or mercury to an alloy containing 92.5% silver. (In English)

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ISSN 0140-0541, 1978, Project Report No. 38/1

DEVELOPMENTS IN BRAZING ALLOYS USED IN THE ROCK DRILL MANUFACTURING INDUSTRY

Rock drills are manufactured by joining very hard tungsten carbide tips to steel shanks with an improved silver alloy braze. Argo-braze 25 is a cadmium-free alloy which contains 25% silver combined with copper, zinc, manganese, and nickel additives. The 36 kilograms per square millimeter room temperature tensile strength of this alloy is sufficiently high to prevent failure of the drill due to fatigue or the brazed joints.

It is a preferred practice among drill manufacturers to heat-treat the steel shank at the same time that the tungsten carbide tips are being brazed onto the shank. The steel heat treatment, however, requires use of a temperature of about 850 C (1562F). At this temperature some of the cadmium and zinc in conventional brazing alloys has been lost through volatilization.

Volatilization is essentially avoided with Argo-braze 25. The 710 C (1310 F) solidus temperature and the 810 (1490 F) liquidus temperature of this alloy are both at least 70 C (126 F) higher than the corresponding temperatures of conventionally used silver brazes.

Heating of the steel to temperatures in excess of the 850 C (1562F) required for the heat treatment is also avoided by use of the novel silver brazing alloy. Conventionally used copper brazing alloys, or bronzes, do not melt below 980 C (1796 F). Even a new copper braze is only molten at temperatures in excess of 890 C (1634F).

The joining of steel and tungsten carbide presents special problems because of the widely different characteristics of the two materials. Argo-braze 25 wets both metals very well. The braze also remains highly plastic as the drill is cooled from the solidus temperature of 710 C (1310F) to 300 C (572 F), the latter temperature being used in hardening the steel shank. Such plasticity of the silver braze is of great importance since the coefficient of thermal expansion of the tungsten carbide rock drill bits is much lower than the steel shank.

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Welding and Metal Fabrication, 1977, volume 45, issue 4, pages 239-240

HIGH-PERFORMANCE HORIZONTAL CONTINUOUS CASTING PLANT FOR SILVER AND ITS ALLOYS

Rods and strips of silver and silver alloys can now be manufactured in improved horizontal continuous casting equipment. The efficient design of this equipment is well suited for the intermittent type of operation which is required when a variety of alloys are to be cast.

The crucible furnace which can hold 750 kilograms (about 24,000 troy ounces) of silver is inductively heated by a thyristor convertor. This convertor has a power output of 130 kilowatts at a frequency of 7.5 kilohertz. Such a thyristor convertor is superior to conventional rotary convertors in a number of respects. It is always ready for immediate operation and the absence of rotating parts ensures minimal wear, thereby reducing maintenance.

To facilitate the attachment of various die units, the furnace is turned at an angle 105 degrees away from the conventional vertical orientation. Dies can be rapidly and securely attached to the furnace. A compressible insulation mat at the interface between the die and the furnace assures a snug fit and minimizes the risk of damage to ceramic joints during frequent exchanges.

A system of drive rolls and pressure rollers is used to draw off the continuously cast silver alloys. This system can pull off the alloys at any desired rate between 3 meters and 90 meters per minute (between 2 inches and about 5 feet per second).

Both round and strip material can be cut by a specially designed saw which is part of the equipment. Round bars of silver alloy measuring 105 millimeters (4-1/8 inches) in diameter are cut into any desired lengths from 250 to 800 millimeters (10 to 31 inches) with a tolerance of $\pm$5 millimeters ($\pm$1/5 inch). Long strips of alloy can best be stored in coils. The 2,400 kilograms (about 77,000 troy ounces) of strip silver which are produced in 4 hours can be wound up into a single coil by a special machine located at the end of this efficient casting line. (In English)

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Wire World International, 1977, volume 19, issue 4, pages 165-68

METAL COATING OF A PENCIL DRAWING

Pencil lines can be coated with copper if they are drawn on a special sheet treated with a silver glutamate ($AgO_2C.CHNH_2.(CH_2)_2.CO_2H$) solution. Electroless copper plating of the pencil-drawn pattern takes place after the silver glutamate composition is selectively removed from all portions of the surface not covered by pencil marks. This novel technique is particularly useful for the copper coating of pencil drawings of printed circuit patterns.

The silver glutamate solution consists of 1 gram of silver glutamate, 10 milliliters of ethanol ($CH_3.CH_2OH$), 10 milliliters of water, and 1 milliliter of ammonia (NH_4OH). This solution is uniformly coated onto an epoxy resin laminate substrate and then dried for 5 minutes at 80C (176F). The substrate material must be one which will not react with the copper plating solution.

A pattern can be drawn on this specially coated sheet with a common 2H pencil. The silver glutamate is then removed from unmarked portions of the surface by simply dipping the sheet in a 1 normal sodium hydroxide solution (NaOH) which contains a small amount of ammonium hydroxide (NH_4OH). Subsequent immersion of the sheet in an electroless copper plating solution yields the desired copper coating on the pencil drawn pattern. (In Japanese)

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Japanese Patent 77 22,810, June 20, 1977

BRAZING ALLOYS

New silver alloys without cadmium have been developed for brazing iron and nickel, which are as effective as the previously used alloys containing cadmium.

A preferred composition for the cadmium-free silver brazing alloy includes 25% silver, 41% copper, 31% zinc, 2% nickel, and 1% manganese. This alloy has a solidus temperature of 670 C (1238 F) and a liquidus temperature of 800 C (1472 F). The excellent strength of a joint formed with this silver braze is in excess of 36 kilograms per square millimeter (353 megapascals or 51,000 pounds per square inch). (In Japanese)

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Japanese Kokai Patent 77 126, 659 October 24, 1977

LIQUID QUENCHING OF FREE JET SPUN METAL FILAMENTS

In the molten state, materials such as glasses and polymers are quite viscous. Jets of these materials are thus quite stable against fragmentation and can easily be cooled to form filaments.

Jets of molten silver, by contrast, are unstable and break up into droplets at a very short distance from the nozzle. Various techniques for stabilizing the silver jet have previously been proposed. One such technique is the deposition of a molten glass sheath around the molten silver filament as is also summarized in this issue of New Silver Technology on page 34.

Another method is by extremely rapid liquid quenching of the jet of molten silver. Molten silver with a purity of 99.999% is ejected through a 0.025 centimeter opening of a quartz tube. This jet, which has a velocity of 250 centimeters per second, fragments after traveling only 0.5 centimeters in 2 milliseconds.

The top of a reservoir of quenching fluid is thus placed only 0.2 centimeters below the tip of the quartz tube. The surface of the jet is hardened before fragmentation can occur if the quenching solution is a 23% solution of sodium chloride maintained at -20C (-4F).

Improved thermal transport is achieved by causing the quenching fluid to flow alongside the silver jet. The jet's velocity of 250 centimeters per second is nearly matched by the 210 centimeters per second velocity of the sodium chloride solution.

Under these conditions the cold liquid comes into direct contact with the hot silver. This technique avoids the formation of a poorly heat conducting vapor film between the metal and the fluid. It is calculated that the heat transfer coefficient and the quenching rate achieved with this liquid quenching technique are at least ten times greater than can be achieved by conventional gaseous cooling.

The average diameter of the silver filament prepared by this technique (for example, 0.025 centimeter) is approximately the same as the size of the aperture in the quartz tube. (In English)

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AMALGAM DENTAL FILLINGS. PART II: THEIR CHEMISTRY AND A FEW PROBLEMS

Amalgams of silver alloys with mercury have been successfully used for generations to fill cavities in teeth. Even now, however, there remain a few technical problems which deserve continued attention.

The principal constituent of the dental alloy, designated gamma, is a non-stoichiometric compound whose composition is approximately Ag_3Sn. During amalgamation the gamma phase reacts with mercury to form a hard compound of silver and mercury and a relatively soft compound of tin and mercury. Both of these compounds are non-stoichiometric. The silver-mercury compound, for instance, has a composition of approximately Ag_2Hg_3 and is designated as gamma-1. Both Sn_7Hg and Sn_8Hg have been used as the approximate formula of the highly corrodible tin-mercury gamma-2 phase.

Continuing attempts to diminish the corrosion of silver dental amalgams have previously been reported in a number of issues of New Silver Technology. A variety of reagents which may often be present in saliva can react with the gamma-2 phase and cause its breakdown. Sulfide ions from eggs, for example, corrode the mercury-tin phase according to the following reaction:

$$Sn_8Hg + 4O_2 + 8S^{--} + 8H_2O$$
$$Hg + 16OH^- + 8SnS$$

Corrosion may temporarily be accelerated if a dentist should inadvertently place a gold inlay so that it will be in contact with a silver amalgam filling. The galvanic electricity due to the difference in potential between silver and gold may even cause the patient to feel a moderate shock. Although the mechanism is not precisely known, it has been observed that galvanic corrosion can be minimized by treatment of the amalgam filling with silver nitrate.

Elemental mercury evolves both during the setting of silver-tin amalgams and during corrosion. Based on years of experience with such amalgams it appears that these trace amounts of mercury do not pose any threat of toxicity. Indeed, almost all the free mercury is effectively eliminated from the body. Despite this great confidence in the safety of such amalgams it seems wise to use the refined techniques available to modern technology to continue the investigation to avoid any possibilities of toxicological effects of the very widely used silver-tin dental amalgams. (In English)

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Chemistry, 1978, volume 51, issue 4, pages 15-19

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In "Upstairs, Downstairs," the folks downstairs cleaned tarnished silver. But that was another time and another place. These days, most people who own silver clean it themselves with one or another product intended to make the task easier.

The newest type of silver-care product does three jobs simultaneously: It removes tarnish, polishes, and treats silver with chemicals that retard further tarnishing. We tested 10 of these three-way products. We also tested six conventional two-way products—they clean and polish but don't claim to provide tarnish retardance. Both types of product include a mild abrasive. You rub the stuff on, wipe it off, and then buff the finish to the shine you want.

There are also one-way products that are only cleaners. All are liquids and don't require tedious rubbing to remove tarnish. You just dip the silver in them or spread them onto silver surfaces. Because of the acid in the liquids, you have to handle them carefully, rinse cleaned silver thoroughly, and tolerate a vile smell as you work.

In our tests, we started with silver surfaces we tarnished in our laboratory. We applied each product, following the label instructions to the letter. Then we assessed the product's performance on the silver-care jobs it is labeled to do.

The Ratings Tables . . . sum up the results of our tests.

We ran the main tests on silver plate of good quality and with a wide variety of finishes and patterns. Then we check-tested the products on sterling silver, which has a harder surface and is chemically different from silver plate.

CU's tests revealed significant differences among the products:

Cleaning. The Ratings point to four liquids judged excellent in removing heavy tarnish: one wipe-on and three dips, which did the job in less than 30 seconds. Remember, however, that dips don't polish and have the drawbacks in use that we mentioned. Two other products, *Tarni-Shield Silver Cleaner* and *Weiman Royal Sterling,* were rated very good as cleaners—easy to rub on and off, removing heavy tarnish fairly easily. (They also received high marks at polishing.)

Polishing. Most of the two-way and three-way products polished silver plate quite well. And six were also especially effective on sterling silver; those six are noted in the Ratings.

Though we judged none of the tested polishes to be excessively abrasive, we applied each to untarnished, mirror-finish silver plate to see if it would affect the finish. A few tended to leave tiny scratch marks that softened the reflections, giving the surface the patina of old silver. Such a patina may or may not be what you want. If you don't want it, steer clear of two pastes, *Gorham Silver Polish* and *Wright's Silver Cream.* We judged them more likely than most to produce a patina.

Retarding tarnish. We judged five of the 10 three-way products excellent in keeping silver plate tarnish-free. Those should keep silver in regular use untarnished for weeks and let you go months without polishing ornamental silver on display. Two of the five, *Hagerty Silversmiths' Polish* and *Goddard's Silver Polish,* also worked particularly well on sterling.

SPECIAL PROBLEMS

Antique finishes. We wondered if these products might change the dark look of silver with an antique or "oxidized" finish. Such pieces are often deeply patterned. . . . To find out, we applied each product to an antique finish, taking as much care as we could not to lighten the dark accents. Despite the precautions, however, every polish removed some of the finish. *Twinkle* seemed the mildest of the lot and would be your best bet if you have a lot of antique-finish silver.

All the dip cleaners damaged antique finishes, too, even when we wiped the liquids carefully onto the silver. Some of them warn of this problem, but two have labels we'd call misleading: *Quik-Dip* and *Afta Dip* both claim to be safe if sponged in certain ways onto antique-finish silver. Neither was.

Satin finishes. The dips were the only cleaners that removed tarnish from satin, or low-luster, finishes without making them shinier to some degree.

Staining. We deliberately sprinkled drops of the products on silver and let them dry to see if they left stains. The dip cleaners left pale stains, and one three-way product, *E-Z-Est Silver Polish,* left a dark stain. To remove the stains, we had to repolish. Many silver tables knives are made with stainless-steel blades, and—just as the label warned—we found that drops from all the dip cleaners could permanently spot or even pit stainless steel if allowed to dry on the surface. To avoid such damage, rinse the knives off promptly after using a dip cleaner on their silver handles.

A VARIETY OF HAZARDS

We tested these products for fire hazard according to the guidelines provided by the Federal Hazardous Substances Act. *Gorham Silvermakers' Silver Polish* (liquid) should be labeled "Combustible," as the regulations of the Act require because its vapors ignited on exposure to flame when we subjected the polish to a temperature lower than 150 degrees F. We deplore Gorham's failure to warn of the hazard properly, though the hazard is not great.

The acidic dip cleaners, as a class, have some inherent hazards that the label may or may not mention. For example, some labels don't suggest using plastic or rubber gloves to protect your hands while cleaning, even though prolonged contact with the cleaner may irritate the skin. Some labels don't warn of the danger of getting a cleaner in the eyes; the *Tarnoff* label does, though omitting adequate advice on what to do if that accident occurs. (Such an accident may be more likely with *Tarnoff* than with the other cleaners: It's the only cleaner with a pump spray applicator.) Some labels fail to mention the necessity for proper ventilation when using dip cleaners—excessive inhalation of sulfide fumes can cause headaches.

RECOMMENDATIONS

As a class, three-way products were higher-priced than the other tested products: 31 cents per ounce or fluid ounce, as compared with 13 cents for two-way products and 21 cents for the one-way dip cleaners. Nonetheless, our preference is for one of the four top-rated three-way products. Although none cleaned silver as easily as the four top-rated one-way products, they also did the polishing job—and did it well. What's more, because of their tarnish-retardance, you won't have to clean the silver again quite as soon.

The dip cleaners worked fast—but you still need to use a polish afterwards. And polishing, after all, is like cleaning all over again. The dip cleaners also pose a few hazards not associated with the others. However, dip cleaners are the only ones you can use on a satin finish.

POLISH-IMPREGNATED CLOTHS

Cloths impregnated with polish seem like a convenient way to clean and polish silver. We tried four of them but did not rate them in the same way as the pastes and liquids.

Two are complete in themselves. *Goddard's Long Shine Silver Cloth* (J. Goddard & Sons Div., S.C. Johnson & Son Inc.), $3.14, and *Hagerty Silversmiths' Gloves* (W.J. Hagerty and Sons Ltd.), $4, dry-clean and polish silver while giving it tarnish-retardant properties. Neither of these requires a separate buffing cloth.

The *Goddard's* is a cloth two feet square; the *Hagerty* is a pair of cloth gloves. Both are impregnated with polish. Both did an excellent job of cleaning light tarnish and retarding tarnish formation, but the *Goddard's* polished a little better than the *Hagerty.*

Unfortunately, the *Goddard's* is for use only on light tarnish, and the *Hagerty* only on light or dark yellow tarnish—neither claims to cope with anything worse. The *Goddard's* cloth is supposed to be effective as long as it holds together, but it can't be washed. You can wash the *Hagerty Gloves*, and fresh powder is available for "recharging" them afterwards. But the powder, which comes in a half-ounce jar, was more expensive than any other tested polish—about $3.50 for half an ounce.

The two other products required a separate buffing cloth. *Gorham Silversmith's Anti-Tarnish Polish Saturated Cloth* (Gorham Div., Textron Inc.), 76 cents for five packets, is an eight-inch square of polish-impregnated cloth packed in an individual foil packet, designed to remove tarnish of any kind, from light to heavy, and to retard tarnish. It's not really very handy because after using it you have to rinse the silver, then use another cloth to dry and buff the silver. However, the product did clean and polish well, and its tarnish retardance was good, But unlike the dry-cleaners mentioned above, this wet cloth was a bit messy to use. And the cleaner stops working once the cloth turns black.

The *Silvena No. 333 Cleaning and Polishing Cloth* (John Ritzenthaler Co., West Conshohocken, PA), $1.95, is actually two cloths: a 10-inch square of dry-cleaning cloth impregnated with jeweler's rouge accompanied by a slightly larger buffing cloth. (The buffing cloth also helps keep rouge off your hands.) Unlike the other cloths, the *Silvena* doesn't claim to provide tarnish retardance. It did a very good job of cleaning all kinds of tarnish, from light to heavy. Its polishing was at least very good. Overall, we judged the *Silvena* a bit better at those jobs than any of the tested two-way products. But we liked it less than the other polish-impregnated cloths because it lacks a tarnish retardant. The *Silvena* is labeled as being "good until worn out," whenever that may be. It warns that washing will destroy its cleaning powers.

RATINGS—SILVER-CARE PRODUCTS

Listed by types, within types, listed, except as noted, in order of estimated overall quality. Ratings order is based on performance on silver plate. See Comments for products that excelled on sterling silver. Except as noted, all tended to shine satin-finished silver undesirably and to cause fading of antique-finished silver (see story). Prices are the average of those paid by CU shoppers.

Key: E=Excellent; VG=Very Good; G=Good; F=Fair; P=Poor.

THREE-WAY PRODUCTS

These products cleaned and polished silver and left it tarnish-resistant. CU does not recommend their use on satin-finished or antique-finished silver.

Brand & model	Price	Type	Cleaning	Polishing	Retarding tarnish	Comments
Goddard's Long Term Silver Foam (J. Goddard & Sons Div., S.C. Johnson & Son Inc., Racine WI)	$3.16 for 6 oz.	paste	G	E	E	
Weiman Royal Sterling Tarnish Preventing Silver Cream (Herbert Stanley Co., Skokie, IL)	$3.50 for 12 fl. oz	liquid	VG	VG	E	Tended to cause antique finish to fade more than most.
Goddard's New Formula Long Term Silver Polish (J. Goddard & Sons Div. S.C. Johnson & Son Inc.)	$2.85 for 8 fl. oz.	liquid	F to G	E	E	Particularly effective at polishing sterling and retarding tarnish on it.
Hagerty Silversmiths' Polish with R-22 Tarnish Preventative (W.J. Hagerty & Sons Ltd., South Bend, IN)	$2.89 for 8 fl. oz.	liquid	G	VG to E	E	Particularly effective at retarding tarnish on sterling.
Tarni-Shield Silver Cleaner with Special Anti-Tarnish Protector, Rose-Mint Lotion Formula (3M Co., St. Paul)	$2.61 for 10 oz.	liquid	VG	E	G	Particularly effective at polishing sterling. Rose-mint fragrance judged needless attraction to young children.
Amway Anti-Tarnish Silver Polish (Amway Corp., Ada, MI)	$2.95 for 8.5 oz.	liquid	F	VG	E	
Hagerty Silversmiths' Wash (W.J. Hagerty & Sons Ltd.)	$2.50 for 7 oz.	paste	G	VG	G	Tended to shine satin finish less than most.
Twinkle Silver Polish (Drackett Prod. Co., Cincinnati)	$1.42 for 12 oz.	paste w/1-2 sponges	F to G	VG	G	Tended to shine satin finish less than most. Tended to cause antique finish to fade less than most.
Wright's Anti-Tarnish Silver Cream Silver Cleaner and Tarnish Preventive (J.A. Wright & Co. Keene, NJ)	$1.60 for 7 fl. oz.	liquid	F to G	VG	F	Particularly effective at polishing sterling.
E-Z-Est Tarnish Preventive Silver Polish (E-Z-Est Prod. Co., Oakland, CA)	$1.69 for 8 fl. oz.	liquid	F	VG to E	P	Particularly effective at polishing sterling.

TWO-WAY PRODUCTS

These products cleaned and polished silver. CU does not recommend their use on satin-finished or antique-finished silver.

Brand & model	Price	Type	Cleaning	Polishing	Comments
Silvo Silver Polish (R.T. French Co., Rochester, NY)	$1.28 for 7 fl. oz	liquid	F to G	VG to E	Particularly effective at polishing sterling.
The following 3 products were judged equal in overall quality; listed alphabetically.					
Gorham Silvermaker's Silver Polish (Gorham Div., Textron Inc., Providence, RI)	91 cents for 12 fl. oz.	liquid	G	VG	Particularly effective at polishing sterling. Tended to cause antique finish to fade more than most. Product found to be combustible and should have been so labeled.
Hagerty Silver Foam (W.J. Hagerty & Sons Ltd.)	$1.53 for 7 oz.	paste	G	VG	
International Silver Polish (International Silver Co., Meriden CN)	$1.34 for 16 fl. oz.	liquid	G	VG	
The following products were judged lower in overall quality than those preceding.					
Gorham Silver Polish Famous Cream Formula (Gorham Div., Textron Inc.)	69 cents for 8 oz.	paste	G	G	Tended to cause antique finish to fade more than most. Tended more than most to produce a patina (see story).
Wright's Silver Cream Silver Cleaner (J.A. Wright & Co.)	85 cents for 8 oz.	paste	F	G to VG	Tended more than most to produce a patina (see story).

ONE-WAY PRODUCTS

These products are acidic liquids that cleaned silver rapidly with little or no rubbing but did not polish it. Except as noted, all were labeled for use as a dip and as a wipe-on. All were judged appropriate for satin-finished silver but not for antique-finished silver. All may leave cleaned surfaces dulled or with a pale stain, but such surfaces are readily restorable with any of the other tested two- or three-way products.

Brand & model	Price	Cleaning	Comments
The following 4 products were judged equal in cleaning; listed alphabetically.			
Goddard's Silver Dip Tarnish Remover (J. Goddard & Sons Div., S.C. Johnson & Son Inc.)	$2.34 for 12 fl. oz.	E	CU's samples mislabeled 10 fl. oz.
Quik-Dip Silver Cleaner (Boyle-Midway Inc, NYC)	91 cents for 7 fl. oz.	E	Label suggestion for use on antique finish judged imprudent (see story).
Tarnoff Instant Silver Cleaner (Wyatt Chemical Corp., Franklin, TN)	$3.12 for 8 fl. oz.	E	Prepared as a finger-pump spray. Spray tended to spatter, requiring care in use. Product can also be used as a dip. Not labeled for use as a wipe-on.
Tarn-X Wipe & Rinse Jelmar Co., Chicago)	$3 for 12 fl. oz.	E	Not labeled for use as a dip.
The following 4 products were judged ceding; listed alphabetically.			
Afta Silver Dip (Afta Corp., Brentwood, NY)			
E-Z-Est Speedip Instant Silver Cleaner E-Z-Est Products Co.)			
Hagerty Fork Clean (W.J. Hagerty & Sons Ltd.)			
Instant-Dip with Magnide Magic Silver Cleaner (Lewal Industries Inc., New Rochelle, NY)			

TWO OTHER WAYS TO CLEAN YOUR SILVER

For purposes of comparison, we tried cleaning and polishing heavily tarnished silver with a stick of jeweler's rouge. That entailed coating a piece of flannel with rouge, rubbing silver surfaces with the flannel until they were tarnish-free, then buffing the silver with a piece of clean flannel. The result was silver just about as clean and bright as we got with the best of the polishes. But the method has two drawbacks: You have to rub a lot more, and the process is messy, producing quantities of red particles that can smudge clothes and furnishings.

However, the rouge was much cheaper than any of the tested polishes. We paid 45 cents for a stick weighing a bit more than 3½ ounces, which should be enough for a good deal of cleaning. Cleaning cloths are reusable until they start to come apart. You can get rouge from hobby shops or firms that supply professional jewelers—we suggest looking in the Yellow Pages under "Jewelers' Supplies" and "Craft Supplies."

lightly less effective than those pre-

$1.04 for 7 fl. oz.	VG	Label suggestion for use on antique finish judged imprudent (see story).
$1.14 for 8 fl. oz.	VG	
$1.50 for 6 fl.oz.	VG	Label limits use to cleaning only fork tines and rated only for that purpose, but product judged essentially similar to other dips. Not labeled for use as a wipe-on.
$1.18 for 8 fl. oz.	VG	

There is also a cheap and easy way to detarnish silver without rubbing—by a chemical process known as electrolysis. First you put the silver in a well-scoured aluminum pot (or in a none-aluminum pot with a piece of aluminum foil). Then add ¼ teaspoon baking soda and ¼ teaspoon salt dissolved in one quart of boiling water. If the tarnished objects are completely immersed and are touching the aluminum, electrolytic action will clean them in minutes. Then be sure to rinse them off well.

Electrolysis should not be used on satin or antique finishes that you want to preserve. Electrolytic cleaning may leave a dullness on silver that only a silver polish can remove. And, of course, electrolysis is just for cleaning, not for polishing. One additional caution: Do not use electrolysis on tableware that may have hollow handles. The boiling solution may soften the cement and loosen the handles.

WANT TARNISH-FREE SILVER? TRY BAGGING IT

One way to prolong the period between polishings is to store silver in tarnish-retardant cloth bags or cloth-lined drawers. The cloth material contains chemicals that absorb sulfurous substances in the air before they can attack the silver. We tested two brands of cloth-storage products: *Pacific Silvercloth* (Wamsutta Specialty Products Group, M. Lowenstein and Sons Inc., NYC) and *Hagerty Silver Keeper* (W.J. Hagerty & Sons Ltd). They did an effective job of keeping silver from tarnishing.

Both *Pacific* and *Hagerty* offer bags of various sizes (starting at about $3 and $2.50, respectively), as well as drawer liners. The *Pacific* drawer liner is ready to use and is priced at $25; the *Hagerty* is a do-it-yourself kit, which is priced at about $17.

For those who want to make their own drawer or cabinet liners, *Pacific* cloth comes roughly 32 inches wide at about $5 a yard. The *Hagerty* line also includes a tie-string storage roll that holds six pieces of silver; it costs about $5.

(Editor's Note: A yearly subscription to Consumers Report is available for $11. Write: Consumers Report, Orangeburg, NY 10962.

HELPFUL HINTS

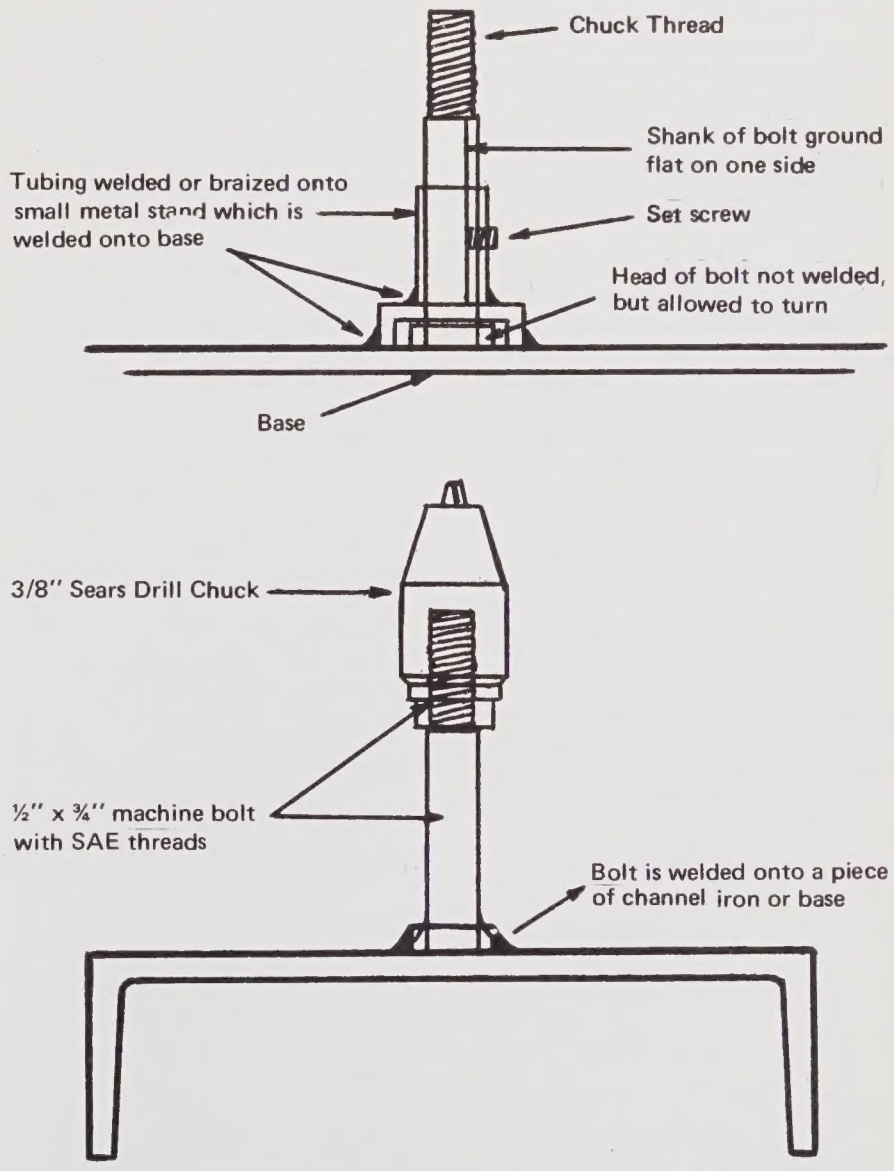
by Barbara Walter

RIVET VISE

A solution to the problem of smashing rivet wire in a vise is this drill chuck mounted on a machine bolt, designed and constructed by my students. The advantage of this vise is the 3 points (lines) of contact rather than 2 with a bench vise. This prevents bending or flattening of the wire between the jaws. The vise is also very good for small work where even a small bench vise is awkward.

Several alternatives in design include: (1) the use of a jacobs chuck where the pressure of the jaws is more easily controlled by a chuck key; (2) welding the bolt at an angle toward the artist instead of perpendicular to the base; (3) mounting the chuck on a swivel base so the chuck may be rotated while working.

NOTE: If the threaded part of the bolt is not long enough to close the jaws, grind the bolt below the threads to a diameter that will pass up into the jaws.


Chuck Thread
Shank of bolt ground flat on one side
Tubing welded or braized onto small metal stand which is welded onto base
Set screw
Head of bolt not welded, but allowed to turn
Base
3/8" Sears Drill Chuck
½" x ¾" machine bolt with SAE threads
Bolt is welded onto a piece of channel iron or base

A jacobs chuck would also work just as well if not better because of the key lock.

SPRAY ETCHING AND ITS APPLICATION TO METALWORK AND JEWELRY

by Linda H. Threadgill

Linda Threadgill, etching test on copper using PERI process, 2½" w

Linda Threadgill, "Trees", copper, spray milled and electroformed, 6½" h. (bottom)

This research was carried out at Tyler School of Art during 1977-78.

Research Objective — To evaluate a spray etching machine using several different photoresisted metals with various etchants to determine its advantages to metalwork and jewelry production.

The etching of circuit boards and micro-integrated circuits in electronics has fostered a growing interest in photoetching a wide variety of metals. The process is also used in the metalworking industry to produce high precision small sheet metal parts that had previously been mechanically stamped.

The main difference between the spray etching machines available today is the system by which the etchant is delivered to the plate. The etchant may be splashed onto the workpiece by rotating paddles or pumped against the plate through stationary or oscillating spray nozzles.

These etching tests were conducted with a 17 liter capacity Chemcut 610 Spray Etching Machine made of chemically resistant polyvinyl chloride and designed for high speed chemical etching and milling. It was equipped with a corrosion resistant pump which forced the etchant through 8 non-oscillating nozzles onto the work surface. It was equipped for both manual and timed etching cycles. The timer accommodated up to 15 minutes of etching time and would turn the machine off automatically. A thermostatically controlled quartz-sheathed immersion heater and water cooling system maintained desired etchant temperature. The adjustable work holder held work up to 11¾" by 12½".

Plates were mounted face down in the workholder which is just inside the lid of the machine and well above the level of the etchant. The etchant filling the bottom of the machine was pumped in a spray vertically against the plate.

The etching of metals requires the use of highly corrosive and poisonous chemicals. Avoid skin contact with etchants, wear eye protection, use adequate ventilation, store chemicals in suitable containers and follow manufacturer's instructions when handling any and all materials. When etching is completed it is important to see to it that all etchants are disposed of properly.

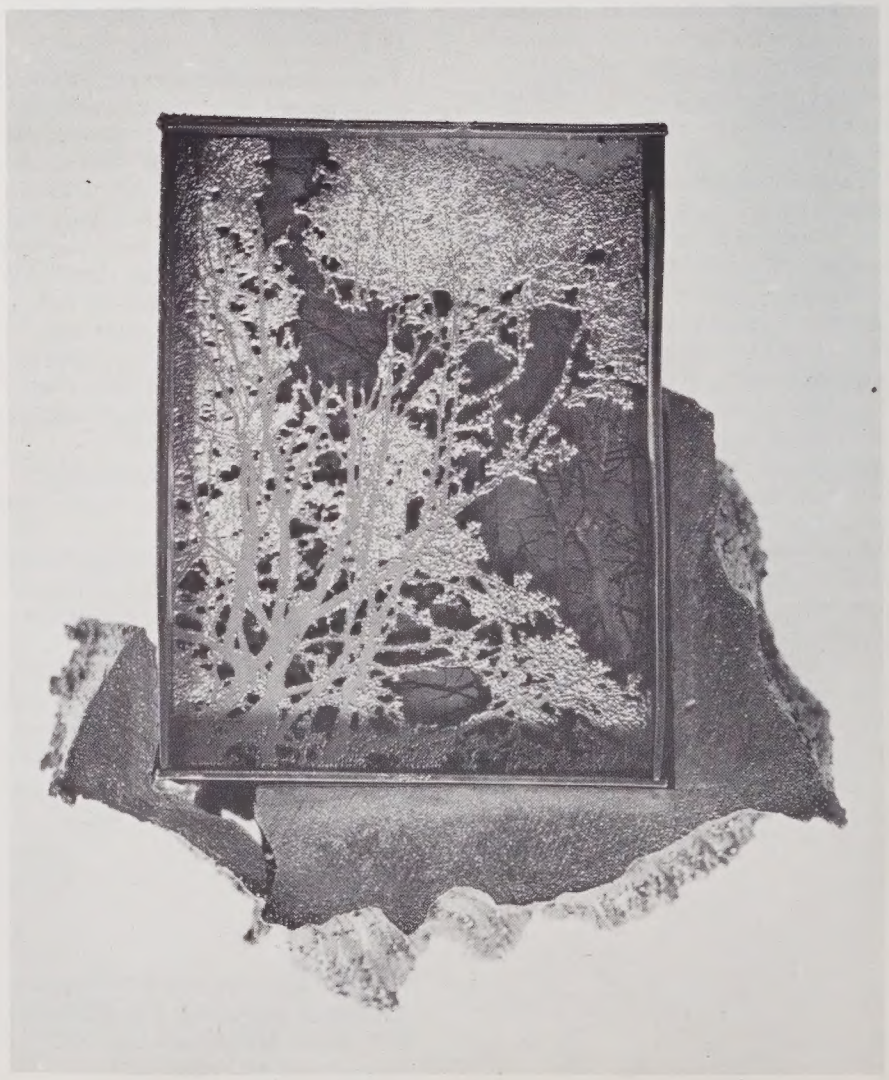
Although a stencil may be made of any acid resisting material that will adhere to the metal plate, such as contact paper, photosensitive resists are most commonly used. A good basic knowledge of photographic processing is essential for the proper use of these resists.

The preparation of the metal prior to etching is as important to consistent quality as the control of the etchant. The images were applied to the plates to be etched with photosensitive resists, solutions of resins in organic solvents which become light sensitive when applied in a thin coating and dried. After exposure, the unwanted areas of the resist coating are removed by the developer leaving a chemically resistant stencil.

Tests were made utilizing Kodac KPR, presensitized plates, and CMR 5000 manufactured by the Dynachem Corp. which proved to be the most reliable. Manufacturer's instructions for its application and exposure were followed without adjustments.

The coating and development of photosensitive resists requires the use of volatile solvents. Provisions for ventilation of the working area should be made to avoid buildup of solvent vapors. Exhaust in the immediate vicinity of the developing tray is essential. Avoid skin contact and inhalation of vapors of these solvents which have been found to be carcenogenic.

The result of resist exposure and development can only be as good as the initial execution of the artwork or Kodalith transparency. A good high contrast Kodalith transparency is essential.



The image to which the coated metal will be exposed can be an image produced photographically on film or a drawing with opaque ink on acetate. If a dot pattern is used, it should be a 50 line or coarser, although a 100 line dot image was successfully spray etched in a very shallow etch test.

In order to determine best etching results, a test Kodalith of various images was made. This test consisted of a dot pattern image, a range of line and dot sizes, and small delicate patterns and broad open areas.

Variables such as tempering, alloying, and heat treatment can influence the quality of etch in most metals. The chemical etching of any metal tends to take place in all directions. As metal is being removed from non-image areas, it is also being removed from beneath image areas by attacking the sidewalls or undercutting. Lines become thin and small dots completely lift. The objective in these tests was to etch as deeply as possible with little or no image loss.

Factors that control results in spray etching are solution of etchant, temperature of etchant, concentration of additives if used and etching time.

Copper was etched with several different acids with and without proprietary additives, which are compounds developed to improve the quality of etch. To evaluate the etch quality when additives were used, results without additives were first studied.

Tests using straight 30 degree Be ferric chloride and tests using 42 degree Be technical grade nitric acid showed an improvement over tray etching in the speed and uniformity of etch but were considerably undercut.

The best results on copper were achieved with an etchant additive formulated by the Platemakers Education and Research Institute (PERI). This institute was founded with the purpose of improving the process of letterpress platemaking. PERI invented and refined this chemistry which is supplied by the Philip A. Hunt Co. and is referred to as ADD-O-GRAPH chemistry.

This additive is used with a 30 degree Be solution of ferric chloride. It is a patented compound which forms an acid resisting film on the sidewalls of the image as the etching proceeds. The film is not a physical component of the original bath, but is chemically formed by a reaction between the additives and the copper it dissolves.

The force of the spray is sufficient to push back the film in the bottom of the etched areas but not damage the film in sidewall areas and a very deep etch can be obtained with perpendicular sidewalls.

The PERI Process was formulated to perform best on engravers copper. In deep etching procedures the best and most consistent results were achieved with engravers copper over other alloys.

Because the filmforming additives decompose with use, an accurate record must be kept of the amount of copper in the bath. Plates are weighed before and after etching. The film-forming additives are replenished according to the amount of copper dissolved in the etchant.

A 14 gauge copper plate was etched for 30 minutes and showed excellent depth, straight sidewalls with no undercutting, excellent detail in fine line areas, and smooth plate surface in broad open areas.

Zinc plates were etched with an 11% nitric acid solution and results were even but undercut. Later tests on zinc with 20% nitric acid solution and Super Etch Additive, manufactured by Revere Copper and Brass Inc., showed improvement in depth with less image loss to undercutting.

A 20 gauge sterling silver sheet was photoresisted and exposed to a Kodalith transparency or "tool" designed for a small part milling operation. It was then etched with a 55% weight/volume mixture of ferric nitrate. The etch was smooth with good slope to sidewalls. The plate was then returned to the bath and milled (etched completely through the plate) in 30 minutes.

In the milling it was found to be necessary to compensate for the lateral etch by slightly oversizing the original artwork because the part was reduced in overall outside dimensions.

There are many advantages of spray etching over conventional tray etching. A deeper etch can be obtained in a fraction of the time formerly required. It is possible to etch intricately detailed images with little or no image loss. Deep etching can be accomplished with straight sidewalls when additives are used. Broad etched areas are smoother and more uniform than with conventional techniques.

The spray etching machine provides many advantages in that it maintains a constant temperature for the etchant, times cycles for consistent results, and supports the work safely above the etching bath for quick and safe removal.

Though it is ideally suited to flat work, there are many forming operations that can be used on the plates once etched.

Milling, or etching completely through a sheet can be useful when tedious piercing would be necessary or when mechanical stamping would distort the part. Precise small parts can be made quickly with burr-free edges and without the metal stress associated with stamping. Also a film image or "tool" can easily be duplicated or altered as necessary.

Etched plates are ideally suited to inlay with resins or enamels. The photo resists are well suited for use in plating baths, and etched images can be plated to give an inlay or damascened look.

The possible applications of this process to metalwork and jewelry are seemingly limited only by the imagination.

SUPPLIERS

1. Chemcut Corp, State College, PA 16801—SPRAY ETCHING MACHINES
2. Dynachem Corp., 110-L Commerce Way, Woburn, MA 01801—PHOTO RESISTS
3. Philip A. Hunt Chemical Corp., Cooper Parkway Bldg., Pennsauken, NJ 08109—ETCHANTS, ADD-O-GRAPH CHEMISTRY, SPRAY ETCHING MACHINES
4. Revere Copper & Brass, Inc., Edes Mfg. Division, Plymouth, MA 02360—ETCHING ADDITIVES, PRESENSITIZED METAL SHEETS

THE PRODUCTION OF DIMENSIONAL SURFACE, EDGE-GRAIN *MOKUME-GANE* (WOODGRAIN-METAL)

by George N. Sawyer

Copyright 1978

This technique had its origin about six years ago when I was trying to figure out how to duplicate some of the intricate patterns I had seen in Samurai sword blades. I had read all of the available descriptions of sword blade forging and soft metal *Mokume-Gane* work and found that the technical descriptions of the process were totally inadequate. So, I struck out on my own to try and discover how to achieve the intricate patterns I had seen on the sword blades.

This technique begins with much the same lamination process others have used. However, an additional folding process that results in a more controlled grain pattern has been added. The analogy between the grain in a block of wood and the grain pattern in this type of *Mokume-Gane* is very close. While the traditional process* results in a composition in which the constituent layers are all basically parallel to the top surface (as the layers of wood in plywood are all parallel to the top layer), this process produces a grain layering which is at a 90 degree angle to the top surface. In other words, the edges of all the layers composing the piece are visible on the top surface, as wood grain is visible in cut, solid wood.

The *Mokume-Gane* resulting from this technique has some advantages over that produced by the traditional process. Since the grain pattern goes through a finished piece at right angles to its top surface, it is not affected by wear. Wear to the top surface simply exposes more material in the same pattern. Since the pattern cannot wear off, this material works particularly well for rings or other objects that are exposed to abrasion or wear through heavy use. This process produces a solid billet of *Mokume Gane* material which can be cut into slices, each with the same grain pattern. By arranging the slices edge to edge, one can produce repeated symetrical patterns similar to those seen in wood or stone veneer arrangements. Also, etching some of the constituent layers results in a more dimensional surface than that produced by the traditional technique.

The disadvantages of using this process are that it is more complex and that the resulting material is not as suitable for deeply formed or raised objects as is the material produced by the traditional process.

MATERIALS

These are the materials from which I make this type of *Mokume-Gane:*

1. 14k yellow gold, 18 ga. (1mm), Crown no. 214 hard silver solder
2. 14k red gold, 18 ga. (1mm), Harris Stay-Silv paste flux
3. Sterling Silver, 18 ga. (1mm), Sparex
4. Copper, 18 ga. (1mm), 50% conc. Nitric Acid, 50% water solution.

One may also use other metals to construct the *Mokume-Gane* billet, but take into consideration the following: The metals must be quite malleable and not differ too greatly in the amount that they work harden; since this technique requires silver solder to join the metals, be sure that the alloys take silver solder relatively easily; if the finished piece is likely to be exposed to heavy wear (such as a ring), one must consider the raw metal color, as a chemical patina is likely to wear off. Since the eye "mixes" colors in close proximity, consider the overall tone of color one desires (for example, if one uses a bronze or brass alloy whose raw color is light yellow adjacent to yellow gold, the color combination tends to "wash out" the gold color); highly-polished surfaces tend to blend into one another and become almost indistinguishable in color. (Red and yellow gold, for instance, are not really distinguishable when they are adjacent in the laminate and are highly polished.) If the finished piece will not be exposed to much wear, *Shakudo* and *Shibuichi* alloys lend nice patinaed colors; and if one places copper or sterling silver between the layers of gold and etches the finished piece, the colors will define themselves nicely.

MAKING THE BASIC LAMINATE

In making the basic laminate, one must consider the dimensions of the piece to be made from the resulting *Mokume-Gane* billet. For most billets I use 18 ga (1mm) thick material about 8 mm wide and 7.5 cm long. For proper color definition, I alternate an etchable alloy with a non-etchable alloy. In most cases I use the metals in the following order: yellow gold, copper, red gold, copper, yellow gold, sterling silver.

Since some separation problems occur with the copper-solder bond, care must be taken to keep the copper as free of oxide as possible. I also coat both sides of the copper strips with silver solder prior to joining them to the other strips. The strips are sweat soldered together in twos and then the three groups of joined strips are sweat soldered together. The laminated stack of six strips is then gently cold forged lengthwise with a raising hammer on a flat anvil. This helps eliminate small voids which may have been trapped during soldering. Annealing must be done frequently to prevent any cracking between layers. From this point on, it is important not to heat the laminate beyond the point where the solder just begins to flow. If too much heat is applied, blistering between layers will probably occur. The laminated strips are worked out to twice their original length with a raising hammer, annealing when necessary and quenching in hot Sparex solution. At this point in the process, one should have a laminated strip about 15 cm long and perhaps 2.5 mm thick.

FOLDING THE BASIC LAMINATE

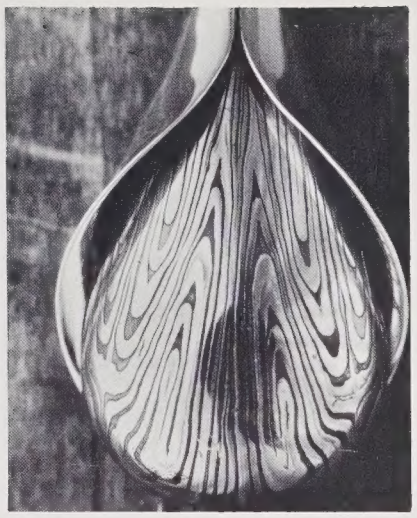
One's next objective is to fold the laminated strip in such a way as to place folds in the CENTER of the billet which will result from this step. Simple end-to-end folding will result in fold patterns at the ends of the billet only. Since this folding step determines the entire grain pattern for the finished piece, I stronly suggest practicing folding patterns with paper strips before continuing in metal.

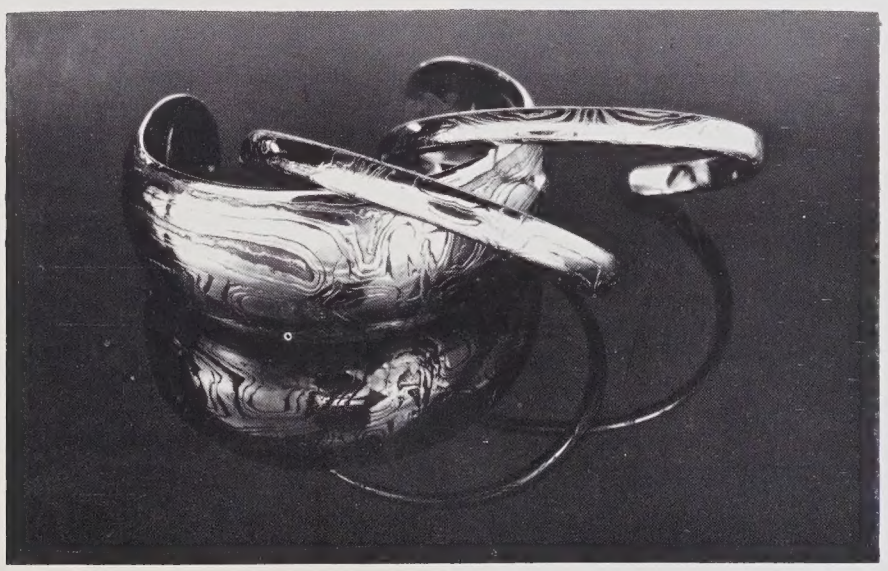
Since the laminated strip is rather rigid, I usually clamp the strip in a vise to begin the fold with the hammer, then transfer the strip to the anvil to complete the fold. It is very important to hammer each fold down tight against the underlying strip and solder it as each fold is made. Failure to get a good solder bond at each successive fold will result in layer separation later in the operation. After each soldering operation, it is necessary to remove any traces of flux by pickling to prevent small pockets of flux from being trapped between layers. After completely folding the strip, one begins to cold forge the resulting billet until a solid rectangle with flat sides is achieved. The sides can also be "squared up" by running the billet through a square wire rolling mill. One must be careful not to crack any seams by overworking the billet. If any small cracks are observed the billet should be fluxed and heated until the solder on the interior of the billet just begins to flow, filling the crack. If the previous steps have been followed carefully, one should now have a solid rectangle about 5 cm long and about 8 mm square with no voids or cracks.

George Sawyer, pendant, 4"h, 14k red & yellow gold, copper & sterling (mokume-gane bead) 1978

George Sawyer, rings, 14k yellow and red gold, sterling and copper with interior linings of 14k red and yellow gold

George Sawyer, detail of mokume-gane bead (symetrical grain pattern) (right)





George Sawyer, bracelets, 14k yellow, red, white, and green gold; sterling and copper; 7 mm to 1½" wide; 1975-77

CUTTING TO EXPOSE THE GRAIN PATTERN

One should not determine how many slices approximately 1-1.5 mm thick one can cut lengthwise from the billet. The cuts should be made parallel to the face of the billet which has the exposed grain showing. If you work carefully you should be able to get five relatively uniform strips suitable for fashioning an object.

ATTACHING THE LINER

It is now necessary to attach a liner of sterling silver or gold (18 ga to 20 ga) to the back of the *Mokume-Gane* strip. This is done to add strength to the strip as well as to form the interior of the piece to be made. First, the surfaces of the slices are flattened by gentle hammering to remove the irregularities caused by sawing. After the pieces are relatively smooth, one can get a good hard solder between *Mokume-Gane* strip and liner. If the completed piece is to be made with more than one strip, the edges of the strips are carefully filed for a good fit and the grain patterns carefully aligned so that symmetry of pattern is achieved. After soldering, the strip-liner combination must be worked gently and repeatedly with a raising hammer and annealed to assure a complete solder bond and uniformity of thickness.

The *Mokume-Gane*-liner combination may now be worked with conventional forming techniques (gently) into almost any form. An important point to remember, however, is to work the grain side of the *Mokume-Gane*-liner combination slightly more than the liner side. This will prevent the softer liner from expanding at a faster rate than the less flexible *Mokume* surface. If the liner expands faster than the *Mokume* surface, seam separation will occur.

FINISHING

After the piece is finished, it is carefully filed, emeried and polished in the normal fashion. It may then either be patinaed or etched to differentiate the individual metal colors.

ETCHING

I use a 50% concentrated nitric acid, 50% water solution (or slightly stronger) for etching. Since the portions of the pattern which are gold will not be affected by the acid, they will remain at the original surface level while the copper and sterling silver areas will be etched back away from the surface. The surface is then emeried with worn no. 600 grit wet and dry silicon carbide paper to bring back the color to the red gold (which is lost when the copper in the red gold alloy is removed by the acid), then polished in the normal manner. This etching delineates the metals in the grain pattern nicely and gives a good dimensionality to the surface. Of course, one may also patina the etched metals for an even more dimensional effect.

*See "Lamination of Non-Ferrous Metals By Diffusion: Adaptations of The Traditional Japanese Technique of *Mokume-Gane* (Wood Grain-Metal)" Copyright 1977 by Hiroko Sato Pijanowski and Eugene M. Pijanowski.

THE RE-INVENTION OF THE WAX INJECTOR FOR UNDER $100.00

by J. Patrick McCrary

More than a few of us, I am sure, would like to have a dependable and relatively inexpensive wax injection system. Unfortunately, there just isn't one available for under $300.00, so necessity being the mother of invention, I headed off to the local department store to purchase an electric pressure cooker, ordered an injection valve from Swest, Inc., picked up a pressure gauge, some pipe fittings and a valve. Heading for home, I wondered not so much if my idea would work, but rather, "could you fix pinto beans in a jelrus?"

Once home I discarded the chrome pressure valve located center top, replaced it with the pressure gauge (no re-threading was required), discarded the black rubber safety valve located also on top and threaded that hole with a ¼"-18 tap. The pipe fitting and brass valve were assembled and installed. Next the hole was drilled and tapped low on the front to accept the injection valve. With this valve in place, wax was loaded in, my compressor hooked up, the system heated up to 200 degrees F, and lo & behold: you can cook beans in a jelrus!

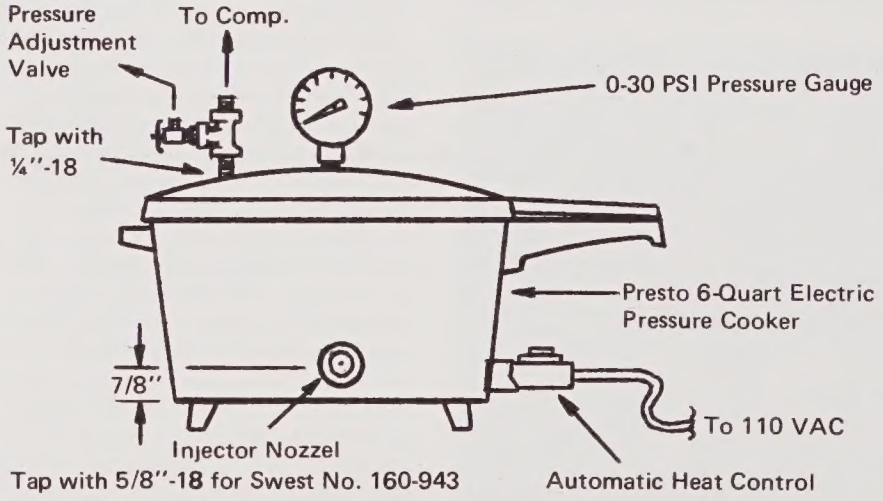
A couple of other economical suggestions for anyone interested in budget wax systems:

1. Rather than spending money on a vulcanizer, use Dow-Corning's RTV-E silastic mould compound. Available usually where you buy plexiglas. No vulcanizer is necessary as RTV means "room temperature vulcanizing."
2. Add an in-line automotive, canister type fuel filter between the compressor and the injector (note direction of flow), to keep your wax free of particles picked up by the compressor intake.
3. Whatever type of wax injector you use, you don't need a fancy or expensive compressor. The small single stage paint compressors, such as sold by Sears, coupled with a small release valve to correct pressure will serve admirably.

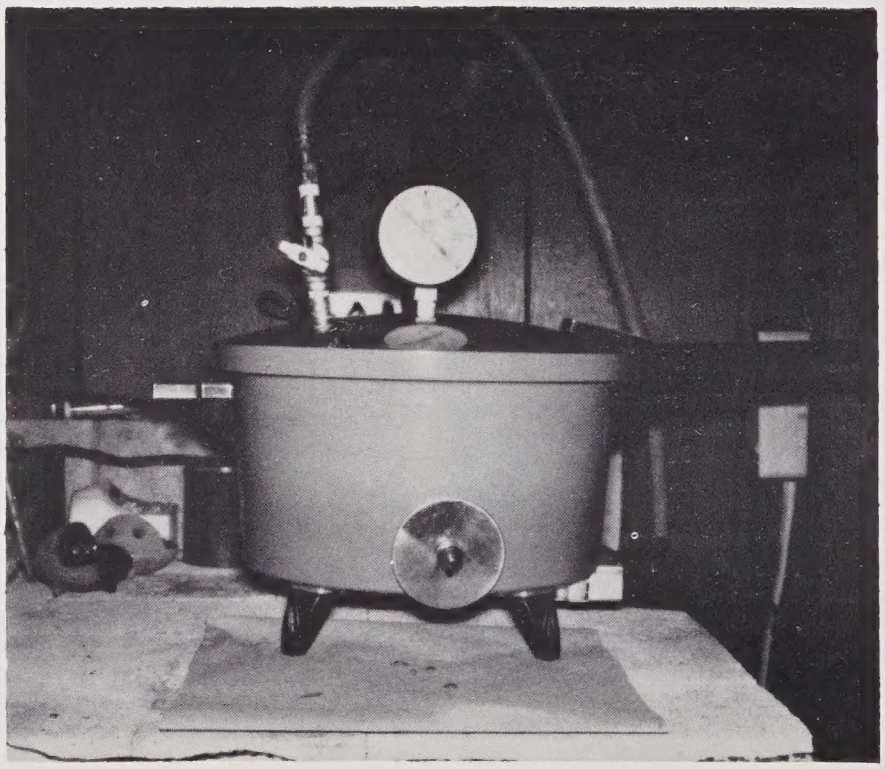
Parts List and Prices—7/15/78

Presto electric pressure cooker (1 only) — $39.99
Wax injection valve (1 only), Swest no. 160-943 — $22.50
0-3PSI Pressure gauge (1 only) — $5.88
¼ pipe nipple (2 @ 19 cents) — $.38
¼ pipe "tee" (1 only) — 59 cents
¼ - 1/8 adaptor (1 only) — 38 cents
1/8 Brass valve (1 only) — $2.19
In-line type automotive fuel filter (1 only) — $2.99
TOTAL — $74.90

Prices, of course, will vary depending on source and area. Having a machine shop fit the injection valve, pipe nipple and possibly the pressure gauge could cost around $30.00.
(Editor's Note: J. Patrick informs us this device has been working like a charm for over a year.)



Tap with 5/8"-18 for Swest No. 160-943



ONE HEALTH HAZARD

by Katia Kamesar

Regarding the use of a saturated solution of boric acid in denatured (methyl) alcohol (which is recommended for use as an anti-oxidant in some of the older jewelry technique books), I have had the following experience:

I prepared this mixture for use on a custom 14K white gold watch band design which required annealing several times and also a number of solder joints. Each time the parts were heated, I dipped them in the solution and burned off the alcohol with a soft flame. The work on the project extended one and one half days.

A day or two later I began noticing symptoms of extreme fatigue along with some unusual sensations in the muscles of the legs and arms. Other symptoms developed quickly over a period of four days: mild nausea, an almost complete loss of appetite, a drop in body temperature, a slower and irregular heartbeat, extreme difficulty breathing, impairment of vision and sensitivity to light.

At the hospital the symptoms were disdiagnosed twice. Suspecting chemical poisoning, my husband described the new mixture I had been working with. Tests called "blood gas" were ordered. The diagnosis was "exposure to toxic substances with a reaction on the lungs."

The exposure consisted primarily of (1) inhalation of the mixture which was evaporating from a small glass container sitting on my workbench and whose lid was not quite air tight and (2) inhalation of whatever gases are produced when the alcohol is burned off and the work is heated. There may have been some absorption through the skin and some minute quantity may have been ingested due to handling the parts and smoking while working.

We concluded that I have an extreme sensitivity to methyl alcohol. Recovery was slow and interrupted by a severe localized skin infection which required minor surgery and which was caused by poisons in the blood. Altogether I was unable to work for two months.

GOLDSMITHING HEALTH HAZARDS

by Linda Weiss

PREFACE AND ACKNOWLEDGEMENTS

As part of the requirements for my M.F.A. Degree at Cranbrook Academy of Art I had to prepare a thesis. Although my primary investigation and thesis were concerned with metal forming techniques, I became so involved with my investigation of health hazards that I subsequently decided to prepare an additional section to my thesis. Some portions of that thesis appear here, with additions and modifications that have come as a result of working with two industrial hygienists from Chrysler Corporation in Detroit. Both Bill Watt and Kent Foster have generously donated their time and expertise. I would like to take this opportunity to thank them on behalf of all the metalsmiths (goldsmiths, silversmiths, jewelers, enamellists, blacksmiths, etc.) who are concerned with a healthy working environment.

A special note to those business minded craftspeople attending the conference: Perhaps, right now, your major concern is the cost/benefit ratio. Of course many preventative measures cost money. But how do you figure the cost of losing your normal breathing capacity, or kidney function? In my opinion, most artists/craftspeople will find that careful management of the workspace and use of preventative measures will result in increased efficiency as well as better overall health.

Linda Weiss © 1978
534 Montford
Mill Valley, CA 94941

INTRODUCTION

In every aspect of my daily life I am, and have been for quite some time, concerned with promoting and maintaining my health. This concern naturally carries over into my working environment. It is my intent, here, to cover the topic of health hazards only as it pertains to the field of metalsmithing, and to suggest safer working alternatives.

Recently, at metalsmithing workshops and conventions, I have heard various presentations about health hazards. The speakers are usually doctors or health science engineers, and I have not found their information adequate, understandable or applicable to the way a metalsmith works. The information usually covers too broad a range, the whole "field of the arts", and is too technical medically and chemically to put to use. Through my research, I have found that the solutions to the health hazards that the metalsmith encounters are not that complex. What is required is that the metalsmith recognize potential hazards and undertake reasonable hygiene and protective measures.

I do not presume to be a doctor or a health science engineer. All of the information presented here has been weeded out of various manuals and texts concerning health hazards in the arts and in industry. This information has been gathered from the sources listed in the bibliography. For a more thorough, authoritative understanding of body functions, systems and occupational disease, I recommend that the metalsmith seek out these resources. I will try to cover most of the potentially hazardous situations and materials that the metalsmith, or jeweler, would encounter in 1) private studio practice, 2) classroom studio situation, and 3) limited production studio.

Very little research has been done on the medical problems of artists as a direct result of occupational health hazards. Most research has been done for industrial-type situations. In many cases, industrial workers have greater volume of exposure but, in industry, there are better facilities to deal with these problems. Thus, most metalsmiths are frequently working under much more hazardous conditions than commonly found in industry. Their lack of concern is frequently due to lack of knowledge about health hazards and safety precautions.

This points to one of the major dilemmas of the independent working metalsmith: locating pertinent, concise information about what materials are hazardous and alternatives for working with them safely. As part of their effort at solving this problem, in all art media, the New York Chapter of the National Art Workers Community made the following five resolutions:

"1. Art schools have a responsibility to set an example of how to work safely with art materials. Art schools should provide safe working conditions and should include, as an integral part of their curriculum, information on the health hazards of art materials and how to work with them safely.
2. Artists and craftspeople have a right to know the hazards of the materials with which they are working. Therefore, art suppliers should fully label their art materials both as to composition and hazards. In addition art suppliers should undertake research to develop the safest art materials possible.
3. Art supply stores should support full-disclosure labeling of art materials and should pressure art suppliers to conform to this standard. (Talk to your suppliers — they buy in bulk and when they repack they should also re-label stating precautions.)
4. Municipal, state and federal governments should pass adequate legislation for full disclosure labeling of art materials and any other legislation needed to protect the right to work in a safe environment.
5. Government agencies should sponsor research to investigate the occupational health problems of artists and craftspeople and should provide free medical treatment where necessary."

I feel that dissemination of information about health hazards throughout the art education system is very important. In this way, health and safety can become a work habit considered from the start, rather than added as an after-the-hazard afterthought.

The question of labeling is very important because if you don't know what's in a particular material, there's no way to know the potential hazards of working with it.

The main hazards most metalsmiths will encounter exist under the following circumstances: 1) inhalation, 2) ingestion, 3) skin contact. Many metalsmiths compound their personal hazards (as well as those who share their studio) by smoking cigarettes. Smoking makes ingestion of toxic substances easier, presents the danger of fire, and contributes to the total body burden of cumulative poisons. There has also been increasing evidence that inhalation of vapors from solvents may increase the risk of cancer much greater for cigarette smokers. Some other individuals who will probably be more susceptible to environmental and occupational contaminants are children, people with allergies, older people, and people with previously damaged organs (especially liver, heart and lungs).

Most of the substances that a metalsmith will encounter do not pose immediate major danger. However, most of these substances are cumulative toxins and have a long-term effect. Doctors refer to this as chronic effect. The problem with this is that the symptoms do not occur at the time of exposure. They build up gradually until the body's tolerance of toxin is reached. This tolerance level will vary from person to person depending on 1) overall health, 2) age, 3) environment. Most cumulative damage climaxes in around 20 years — that, for someone in their early twenties, could mean cancer at the age of forty.

Actually, I really don't intend this article to cause anxiety so much as caution. I hope this information will serve other metalsmiths who are concerned about health and maintaining a safe working environment. The solutions that I offer for minimizing health hazards should be understood to be general guidelines and, of course, will probably have to be modified to fit every individual's personal workshop conditions and working habits.

HOW HARMFUL SUBSTANCES ENTER AND AFFECT THE BODY

Most substances that are potentially harmful to the metalsmith must get on, or in, the body to do any damage. A toxic material is harmless when it sits in the appropriate container. Toxicity is the potential of a material to affect living cells adversely. Conditions that will influence the toxicity of a given substance are (a) quantity of dose, (b) rate of absorption and (c) route of entry. The degree of toxicity is greatest by the route that the harmful substance takes to reach the bloodstream most rapidly. For metalsmiths, inhalation is the primary avenue for most toxins reaching the bloodstream. Skin contact is the next most important means, followed by ingestion. Almost all materials the metalsmith encounters have the potential to cause bodily harm. However, a toxic substance is not a health hazard until it is mis-used. The key is to know about these substances and to maintain a safe studio and healthy work habits.

The body is capable of coping with small doses of toxic materials. Almost every activity in daily life, and in the environment, brings us in contact with toxic substances. It is my opinion, from the research I have done, that the level of toxins in a private studio, academic studio and commercial studio are of high enough concentration to be given special consideration.

LUNGS—The lungs, under normal circumstances, can clear themselves. However, one can gain a deceptive sense of self confidence by thinking in terms of only a single pollutant.

Such thoughts as "I'm only exposed to soldering fumes for twenty or thirty minutes each day" tells very little about the total assault on the lungs. We must also contend with solvent vapors, acid mists, kiln burnout, enamel fumes and abrasive particulates. If one recognizes the concept of multiple insults of different materials on the same organs, this false level of confidence is not justified. (Especially since so many of the toxins we come in contact with are cumulative.)

When irritants injure the lungs, it is usually something equivalent to a burn. As in response to any burn, the injured tissue will pour out fluid from the bloodstream. Fluid accumulation in the lungs interferes with oxygen exchange. This can lead to a type of suffocation called pulmonary edema. (Edema means swelling caused by fluid). If this is not fatal, there is usually permanent lung damage called pulmonary fibrosis (scarring).

Whether or not a substance gets beyond the lungs to affect the rest of the body depends on whether it is soluble in the blood.

BLOOD—Substances that affect the blood can have very serious effects on the brain, kidneys and heart. Red blood cells are responsible for transporting oxygen, in the hemoglobin, to all body tissues. White blood cells make antibodies to maintain the body's immunity system and help fight infections. Some harmful fumes attack the bone marrow — this affects its ability to produce new blood cells.

LIVER—The liver functions to detoxify substances that are produced by body processes as well as harmful substances that enter the body from the environment. When the burden of toxins is too great, the liver will be damaged and will not be able to detoxify any poisons, the body's or otherwise. Hepatitis, commonly known as a viral disease, can also be caused by chemical substances. In severe cases, this can lead to scarring of the liver (cirrhosis). Symptoms of liver disease are often vague. A yellow tint to the skin will indicate liver damage (jaundice).

KIDNEY—The kidneys function as filters which help to maintain balance or a constancy of the internal environment. They individually monitor and regulate most of the major constituents (proteins, sugars, salts, water and waste products) of the blood, as well as several minor constituents. Since approximately 2000 liters of blood flow through the kidneys each day, a nephrotoxin in the blood which reaches the kidneys may cause severe damage. The kidney function may be impaired or the damage may result in complete failure.

Coke-oven workers have a high incidence of kidney cancer. So it is advised that blacksmiths who use coke for fuel have good exhause ventilation if their forge is maintained indoors.

THE NERVOUS SYSTEM—When the central nervous system is damaged, the damage is permanent. The central nervous system consists of the brain and the spinal cord. Some toxins in metals can cause CNS damage, others can damage the peripheral nerves, which are considered to be a separate system. The brain cannot survive very long without oxygen, and many of the substances that the metalsmith encounters have the potential to interfere with the body's oxygen supply. Some warning symptoms are dizziness, drowsiness, and feeling intoxicated.

EARS—Excessive noise can have both temporary and permanent effects on the ears. Many metalsmithing processes produce high levels of noise. This ranges from hammering to machines, grinders, power mills, lathes, etc. Almost all occupational ear damage could be prevented by wearing ear plugs and/or ear muffs. People who wear eye glasses should be aware that the temple part of the glass frame can reduce the effectiveness of ear muffs by 30% because they prevent proper sealing around the ear. Such people are advised ear muffs with ear plugs.

SKIN—Skin ailments are one of the most frequent occupational hazards caused by chemical substances. There is no mystery about a skin ailment—it's always visible. It has been estimated that more than 90% of occupational dermatitis is preventable by simple principles of industrial hygiene. Proper gloves and protective clothing should be worn. Even if a substance is not causing a skin reaction, these precautions should be used because many harmful substances are absorbed through the skin without necessarily irritating it.

Substances that damage the skin directly are called primary irritants. These substances penetrate the outer layers of the skin and injure the underlying layers. In the case of primary irritants, all people exposed to the same concentrations of these substances will have identical skin irritation.

The skin irritation caused by direct contact with chemicals can look like any other form of dermatitis: pimples, sores, flakes, etc. But it always appears where direct contact with the substance occurs, and usually goes away when contact with the irritant has ended. Such dermatitis does not usually spread to other parts of the body.

Substances that aren't normally irritating may cause dermatitis if the skin *develops* an allergy to them. Once the body's immune system has "learned" to react against a substance this way, it will "remember" the reaction for years, even with infrequent contact with the irritating substance. In some cases, the reaction is no longer present. In other cases, the reaction will only re-occur when the body comes in contact with the original irritating substance, or a similar one at a later time.

Contact dermatitis or sensitization takes time to *develop*. It never occurs on the initial exposure to a new substance. Cases have been known where people would suddenly develop an allergic reaction to a substance they had been using for many years. However, when the skin develops a sensitivity to one substance, that does not necessarily increase the changes of becoming sensitive to another unrelated substance.

The following section has a list and a dictionary of harmful substances. In cases where alternatives are not offered, the reader may find safety measures covered in another section of this paper. If there is no safer alternative found elsewhere, it is because, in my research, there was none suggested. The reader may interpret this as he/she likes.

POTENTIALLY HARMFUL SUBSTANCES ENCOUNTERED BY THE METALSMITH

ABRASIVES—Silica dusts; chromium emery; rubber adhesives; resin bonding agents

ACIDS—Aqua-Regia; cyanides; ferric chloride; hydrochloric; hydrofluoric; nitric; sulfuric; sparex

FUELS—Acetylene; arsine; carbon black; carbon monoxide; coke; oxy-acetylene; phosphine; propane

ENAMELLING—Arsenic; carbon monoxide; cerium; flourides; lead

METALS—Aluminum; antimony; cadmium; chromium compounds; copper compounds; lead; magnesium compounds; manganese compounds; mercury; nickel compounds; pewter; platinum; silver compounds; stainless steel; tellurium; tin compounds; titanium; zinc compounds

PLASTICS—Epoxy resins; phenolic resins; polyester resins

SOLVENTS—Acetone; Attack (brand name); benzene; chlorinated hydrocarbons; ketones; laquer thinner; methanol (methyl alcohol); naptha; toluene/toluol; turpentine; xylene

MISCELLANEOUS—Ammonia; asbestos; flourides; fluxes; hydrogen sulfide; investment; liver or sulfur; mica; pitch; solder; styrofoam; sulfur dioxide; talc; wax

DICTIONARY OF SUBSTANCES

ABRASIVES—See individual listings for silicas and dusts.

ACETONE—a solvent. Very flammable. Flash point—4 degrees F. Acute toxic effects: headache, drowsiness, irritation of eyes, nose, throat; vomiting. It is one of the least toxic solvents, is quickly eliminated by the body, has little residual effect. Because it is highly flammable, it should be used with great care. Acetone will dissolve surgeons rubber gloves.

ACETYLENE—fuel. Commonly used in cylinder form. In low concentrations, acetylene is a mild narcotic or intoxicant. In large concentrations, it can cut off oxygen supply. Commercial acetylene is contaminated with PHOSPHINE, HYDROGEN SULFIDE, ARSINE, CARBON DISULFIDE AND CARBON MONOXIDE — all are extremely toxic. See individual listings for these substances. Acetone is always present in the cylinder — DO NOT LAY THE CYLINDER DOWN!

ACIDS—See individual listings. Most acids are caustic and irritating to the skin, mucous membranes of the nose and eyes, and the lungs. ALWAYS ADD ACID TO WATER, never the reverse! Heat is usually generated and an explosion could result. When working with acids, one should wear protective clothing, work under an exhaust fume hood and have an eye wash station close by. Respirators for acids are different than respirators for particulates. Acids should be returned to the distributor for proper disposal.

AMMONIA—Usually used for cleaning buffing compounds from a piece. It is caustic to the lungs, may lead to pulmonary edema (when lungs fill with fluid), or pneumonia and lung scarring. It is an eye irritant both in solution and in gas form (fumes), usually damaging the cornea. Effects of long-term exposure to ammonia in low doses have not be studied, but this would probably perpetuate chronic bronchitis and emphysema. Ammonia would best be used in extremely diluted solutions of soap and water.

ANTIMONY—Used in pewter. It has not been established if antimony is harmful. The oxide is probably not toxic, but it can cause dermatitis.

AQUA REGIA—This acid, called "royal water", is very powerful. It will dissolve or etch gold as well as silver. It is made by adding one part nitric acid very slowly to three parts hydrochloric acid. Its bottle should never be tightly stoppered. Its fumes are highly corrosive, and it should be stored and used in an area that is well ventilated.

ARSINE—a contaminant in commercial acetylene; an eye, nose, throat and lung irritant. Can cause kidney damage; destroys red blood cells, can cause brain poisoning.

ARSENIC—released in fumes from some enamels when fused. Causes skin cancer, thickening of the keratin, or outer layer, of the skin, and perforation of the nasal septum. Causes nerve function disorder. Kilns should be well ventilated.

ASBESTOS—is mostly harmful in dust form. It is frequently used for its fire resistant properties. It is a carcinogen — its effects take 20-30 years to develop in humans. It causes ASBESTEOSIS, a lung scarring and MESOTHELIOMA, cancer of the lining of the chest. Asbestos is the only cause known of these two diseases. It is an insoluble substance, one that will not dissolve in the blood and tends to remain in the lungs for long periods of time; the lungs cannot remove it or destroy it.

"Asbestos is a fibrous material. Like cotton, its fibers can be made into thread and cloth. Unlike cotton, its fibers are as strong as piano strings."[1] These very strong fibers are very tiny also and can float like water vapor in the air, rarely settling. They are virtually indestructible in the body, and in the environment. Asbestos also has been found to have the ability, and tendency, to absorb other harmful chemicals onto its surface. It can also cause cancer of the intestinal tract, stomach and rectum. Alternatives that can be substituted for asbestos are: pea pumice, as is found in annealing pans; charcoal blocks; fire bricks; magnesium blocks; Wesgo refractory block; heavy leather gloves and aprons. Also, if a casting crucible is properly prepared by melting borax in it, and students are carefully supervised, asbestos lining of a crucible will not be necessary. Substitutes for asbestos fabrics, like gloves and fireblankets, are KEVLAR and REFRASIL. "It has been found that smokers have 10 times a greater chance of getting lung cancer than non-smokers. Non-smokers who work with asbestos have 10 times the chance of getting lung cancer as people who do not contact asbestos. But people who both smoke and work with asbestos have 100 times the chance of getting lung cancer."[2]

ATTACK—a brand name of a very efficient epoxy solvent. It contains CHLORINATED HYDROCARBONS. Avoid skin contact and use with good ventilation.

BENZENE—a solvent for plastics. Very flammable. Flash point 12 degrees F. Intoxication, coma, respiratory failure; can be fatal. Causes severe damage to bone marrow leading to fatal anemia or leukemia. Use an alternative, less toxic solvent. DO NOT USE! Solvents, like acids, should be returned to the chemical distributor for proper disposal. Do not pour down plumbing.

CADMIUM—is found in silver soldering and silver brazing compounds. Cadmium fumes can occur during casting and welding also. Know if your alloy contains cadmium. Change alloy or provide good ventilation. Cadmium affects the brain, nervous system, lungs, kidneys, bone, prostrate and digestive tract. It can cause acute bronchitis, pneumonia, digestive disorders, dermatitis, allergic hypersensitization, chronic brain damage, lung damage, prostate cancer and kidney stones.

Because of its extreme toxicity, products containing cadmium are required by law to be labeled. Ask your supplier to label solders.

CARBON BLACK—refers to the specific product of incomplete burning of fuel (natural gas, acetylene). Exposure to large quantities can cause lung scarring and promote skin cancer.

CARBON MONOXIDE—incomplete combustion when firing kilns, doing welding or copper enamel. Carbon monoxide poisoning affects the blood hemoglobin preventing the transport of oxygen to the heart, brain and lungs. It can be detected in extremely advanced stages because the victim's face and fingernails turn cherry red. Good ventilation will prevent carbon monoxide poisoning in the average studio. It should be remembered that carbon monoxide is colorless and odorless.

CHLORINATED HYDROCARBONS—solvent for plastic and waxes; very toxic. Dissolves fatty layer of the skin, causes dermatitis, liver and kidney damage. In general, **try** to replace chlorinated hydrocarbons with less toxic substances. When this is not possible, use good exhaust ventilation and wear protective gloves. Neoprene rubber is best — do not use butyl rubber or natural rubber.

CHROMIUM COMPOUNDS—fumes from chromium compounds are produced in welding. There is a much greater danger from a gas or fume form than from solid form of most toxins. It affects the skin, dermatitis, lungs; inflammation, asthma, and cancer; lining of the nose and nasal system. Use good ventilation.

COPPER COMPOUNDS—copper has been found to be highly toxic to animals in test situations, but there has been little testing in industrial circumstances involving people. Fumes of copper oxide are poisonous, irritating the lungs and intestines. It causes metal fume fever; recovery is usually complete in 1 or 2 days. Eyes and skin are sensitive to copper. There is no conclusive evidence about long-term exposure. Good ventilation is recommended for processes that involve heat, leading to the formation of copper oxides. If the metalsmith find some type of dermatitis developing, he/she may want to wear gloves when handling copper-containing alloys.

CYANIDES—sodium cyanide, ferrocyanide, cuprous cyanide and free cyanide are all used in electroplating bath formulas. It is known that the mist of cyanides are harmful, and one should use good ventilation and/or the appropriate respirator. It is also suspected that cyanide mists cause harm when absorbed through the skin, so protective clothing is advised.

EPOXY RESINS—cause contact dermatitis. It is recommended that gloves be used. During the mixing and curing processes, use good ventilation and avoid inhalation of dusts and fumes, and avoid skin contact with uncured epoxy resin and hardeners.

FERRIC CHLORIDE—used as a metal etching acid when a sharper etch is desired than can be achieved with nitric acid. Can irritate the skin and the respiratory tract. Use protective clothing and good ventilation.

FLOURIDES—found frequently in fluxes. They produce hydrogen flouride vapors which dissolve in the lungs where they produce hydro flouric acid and burn the lungs. Have your supplier label flux contents. Use good ventilation. Avoid breathing fumes.

FLUX—see FLOURIDES.

GOLD—some people are allergic to gold. They should prevent skin contact. This is probably a reaction to the alloys in karat gold.

HYDROCHLORIC ACID—(hydrogen chloride) used in metal patinas and etching. An irritant to mucous membranes. In mist and gas forms, this acid can damage lungs, cause tooth erosion and damage cartilage in the nose. Use good ventilation and prevent skin contact.

HYDROGEN FLOURIDE—(hydroflouric acid) used in enameling to etch glass. Skin contact should be avoided. If it does occur, flush area with water and see a doctor. Fumes affect the lungs, leading to bronchitis, pneumonia, etc. Do not breathe acid mists.

[1]Stellman—*Work is Dangerous to Your Health.*

[2]McCann—*Health Hazards Manual for Artists.*

HYDROGEN SULFIDE—a byproduct of using liver of sulfur in combination with water and heat. It is characterized by an odor like "rotten eggs". See LIVER OF SULFUR. 10 ppm (parts per million) is the threshold limit value. It is more toxic than cyanide. In high concentrations it can paralyze the olfactory nerve.

INVESTMENT—avoid inhalation of dust; wear a particulate mask. Use recommended ventilation when mixing large quantities.

LEAD—lead is a cumulative poison. Its compounds and its oxides should be treated carefully. It can be found in some bronze alloys and in some enamels (and we are all exposed to it from automobile exhaust fumes). It is harmful in dusts and in fumes, causing damage to the brain, central nervous system, red blood cells, bone marrow, liver and kidneys. Use protective measures and good ventilation. Lead fumes are very toxic. The body will absorb five times as much lead into the blood via the lungs than from the digestive tract. The body will retain lead for long periods of time, leading to cumulative poisoning; it is stored in the bone marrow.

KETONES—acetone, methyl ethyl ketone, methyl propyl ketone, methyl butyl ketone, ethyl acetate, amyl acetate. Lacquer thinner is a mixture of several of these solvents. Flash points vary from -4 degrees F to +89 degrees F. Ketones are skin, eye and respiratory tract irritants. They cause defatting of the skin and peripheral nerve damage. Use gloves and good ventilation and/or appropriate respirator.

LACQUER THINNER—see KETONES

LIVER OF SULFUR—is potassium sulfide and it is used to oxidize metal (gold, silver, copper). When it is heated to decomposition, it will emit highly toxic fumes of oxides of sulfur. These can react with moisture to produce another toxin — hydrogen sulfide, which is caustic to the eyes, the lungs and corrosive to mucous membranes. In high concentrations (around 700 ppm) it can cause suffocation and brain damage. Wear a respirator and work in a well ventilated area. (see HYDROGEN SULFIDE)

MAGNESIUM COMPOUNDS—in the forms of m. silicate, m. chromate, m. oxide. Encountered in welding fumes. It is known to affect the lungs, cause digestive disorders, metal fume fever, and is believed to affect the central nervous system. Use good ventilation when welding.

MANGANESE COMPOUNDS—m. carbonate, m. dioxide-black, m. dioxide-green, m. sulfates. Manganese is encountered in fumes from welding (it is frequently used to coat welding rods) and enameling. It affects the liver, lungs and central nervous system. Symptoms are headache and weight loss. Diseases that can result are pneumonia and manganism which is a permanently crippling disease of the central nervous system similar to Parkinson's Disease. Provide good ventilation in welding areas.

MERCURY—mercury is a cumulative poison. It may be encountered in gold and silver refining, and in welding. It affects the brain, kidneys and nervous system. Mercury can be used to gild silver; however, electroplating is more commonly used.

METHANOL—(methyl alcohol) is often found in a small percent in denatured alcohol which is frequently used as a solvent for pitch, and a fuel for alcohol lamps that may be used when working up wax models for castings. In high concentrations, it attacks the respiratory system, gastro-intestinal system, central nervous system, the liver and the optic nerve. Use proper ventilation.

MICA—used for plique-a-jour enamel work. Can also be found as a filler in some plastics. It is a silicate and should be handled carefully. It is advisable to wear a particulate mask.

NICKEL COMPOUNDS—nickel is found in the alloy called German Silver. n-oxide-green, n. oxide-black, n. carbonyl — are byproducts of welding nickel alloys, like stainless steel. Nickel carbonyl is the most toxic of the nickel compounds. Its gas can be absorbed by inhalation and through the skin. Body systems affected are the lungs (asthma and cancer) and the central nervous system. Skin contact with nickel salts may cause nickel itch, an allergic dermatitis. Once this sensitivity develops, the person will react to even extremely small amounts of nickel. Wear protective clothing and work in a well ventilated area.

NITRIC ACID—usually used for etching metal. Very irritating to lungs. Symptoms of over-exposure are chills, fever, chronic cough. When etching copper, nitrogen oxide fumes are produced; these dissolve in the lungs and can cause pulmonary edema and chemical pneumonia. Also, very irritating to the eyes. Exposure to low concentrations over extended periods of time are cumulative in terms of burning and scarring of the lungs. Wear protective clothing and work in a ventilated area or wear a respirator designed to cope with acid mists. Return all acids to the chemical distributor for proper disposal. Do not pour down plumbing or dump outside.

OXY-ACETYLENE—(see ACETYLENE) Use eye protection with tinted glass that is impact and heat resistant and will prevent penetration of radiation.

OZONE—occurs during welding. It destroys enzymes in body tissues. It has a distinctive odor (you can smell it during a lightning/thunder storm). Prolongs inhalation above 0.05 ppm can cause burning of the cells in a manner similar to X-rays. It can be detected by continuous monitoring devices.

PEWTER—pewter used to be made from tin and lead. Modern pewter is an alloy of tin and antimony and copper. Extreme care must be used if one is working with the older alloy because of its lead content.

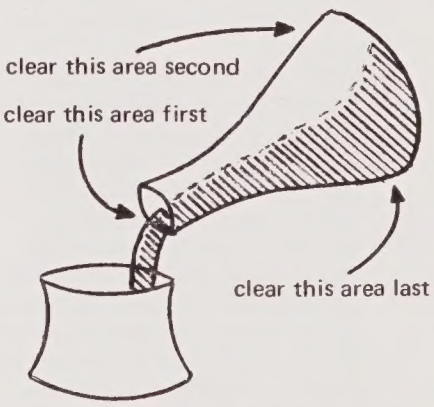
PHOSPHINE—a contaminant in commercial acetylene. Has been known to cause kidney damage and is an irritant to eyes, nose, throat and lungs.

PITCH—when pitch is made from a coal tar derivative like asphalt, it can be a skin irritant and photo sensitizer, leading to skin cancer after repeated, intermittent exposure over many years. When using pitch for chasing, repousse and engraving, it is advised that gloves be worn when handling the pitch itself. Once the work is secured in the pitch, the gloves can be removed to use your chasing, repousse, and engraving tools efficiently. If the fingers need to be braced on an area that is exposed to pitch, the pitch can be covered with Saran wrap with a very thin coating of petroleum jelly, if desired, as a separating agent between the Saran wrap and pitch.

True "Brown Swedish Pitch" is a pure vegetable pitch and can be differentiated from pitch adulterated with rosin and bitumin (coal tar products) by color; it is brown and has an agreeable odor. Pitch that is not the pure vegetable type is black and gives off offensive vapors. To test for color, Swedish pitch, when melted and pulled out very thin, shows clear translucent brown when held to a light. Precautions should be used when working with either type of pitch but the Brown Swedish Pitch is far less hazardous.

Care should be taken not to overheat pitch. Boiling destroys the tenacity and it becomes a fire hazard. Pitch, when heated, tends to form a skin on its top surface and to trap explosive gases underneath. To avoid this, heat the pitch slowly and evenly, occasionally stirring to break the skin and release these gases. It is wise to use good ventilation when melting either type of pitch.

Extra care is needed when a large bodied vessel with a narrow opening has to have pitch removed from it. Pitch expands with great force when heated. If the mouth of the vessel becomes clogged with hard pitch, while the pitch behind it approaches the melting point, an explosion can result. This problem can be solved by laying the vessel so the opening is a little lower than the body and warming the opening first. When the opening has been cleared of pitch, direct the soft flame to the "top" of the vessel.



PLATINUM—metallic platinum is nontoxic, but some platinum compounds can cause contact dermatitis and respiratory allergic reactions which have been known to lead to asthma and emphysema. Fumes from platinum that are encountered in soldering, casting, or refinishing, should be avoided. They are lung and skin irritants.

POLYESTER RESINS—one of the many plastics that metalsmiths use. They are skin irritants, and protective clothing should be worn. When casting these substances, harmful vapors are given off from catalysts, thickeners, binders and other additives. They should be used with good exhaust ventilation or respirators. Read the labels regarding proper storage. Some organic catalysts are heat sensitive and explosive.

SILICA—encountered as abrasive dusts, in metal finishing procedures, sand blasting, buffing, sanding, etc., and in lapidary work. Silicosis, a lung-scarring disease, results. Wear a mask for particulates. Some substitutes are silicon carbide, steel shot or glass beads.

SILVER COMPOUNDS—s. chloride and s. nitrate. Absorption of silver into the tissues is called argyria. This is indicated by a blue black discoloration in the skin and eyes. (This is not the same as when your skin will turn gray from silver jewelry — this is a coloration IN the skin that cannot be washed off.) These silver compounds harm the body when they are in vapor or dust form. When using mechanical devices for abrasion (sanding, buffing, etc.) of silver, wear eye protection because silver deposits in the eyes will cause night blindness. Other body parts affected are the lungs and kidneys.

SILVER SOLDER—frequently contains cadmium, brass (copper and zinc). All soldering should be done with good exhaust ventilation.

SOLVENTS—used for machinery clean-up and maintenance, dissolving plastics, and removing pitch. Solvents can enter the body by inhalation, skin absorption or ingestion. Ingestion is rare. Wash hands before going to eat. Wear gloves when working with solvents; do not smoke when using solvents (this also presents a fire hazard). Swallowing solvents is usually fatal and will cause blindness. All solvents should be used with good exhaust ventilation. The ventilation should be at the same level as the work rather than above the work. Gloves should be worn to prevent skin contact; solvents can dissolve the fatty layers of the skin and can cause systematic poisoning. See ACETONE, AMMONIA, BENZENE, KETONES, METHANOL, TOLUNE, TURPENTINE, XYLENE. Please note that this is a very broad definition for solvents. It would be wise to investigate more thoroughly the specific products in use in your own studio. When in doubt return solvents to a local distributor. If your supplier can't tell you who the distributor is, check with local machine shops, the national manufacturer or your state board of NIOSH.

STAINLESS STEEL—when welding stainless steel, harmful nickel compound fumes are produced. See section on NICKEL COMPOUNDS. Do all welding in a well ventilated area.

STYROFOAM—occasionally used for models for casting. Heating styrofoam for forming and for burnout releases toxic gases and requires efficient exhaust ventilation. All styrofoams are different. Contact your supplier for a Safety Data Sheet.

SULPHURIC ACID—used for cleaning metals. Very irritating to the respiratory tract, skin and clothes. SPAREX is a product used as a substitute for sulphuric acid. Both substances can be neutralized with bicarbonate of soda and water or soapy water. Many metalsmiths make the mistake of thinking that SPAREX is harmless. This is not true! Sparex is sodium bisulfate in granular form. This makes for safer, convenient storage than is possible with pure sulphuric acid. However, once Sparex is mixed with water, it is as comparatively dangerous as sulphuric acid, especially when it becomes concentrated due to water evaporation. When Sparex solution is heated, the fumes given off are equal to sulfuric acid fumes. Use ventilation.

SULFUR DIOXIDE—is found in fumes from tin compounds when they are melted. It is also a breakdown product of liver of sulfur. It is harmful to breathe sulfur dioxide gas. It is a highly soluble gas and dissolves in the watery passages of the breathing tubes. It does most of its damage in the upper respiratory tract which will then go into spasms and prevent the gas from getting further into the lungs. This gas is also encountered in environmental smog and is considered to be a major eye irritant. Use ventilation and/or appropriate respirator.

TALC—occasionally used as a separating agent with rubber molds and frequently used in plasters. Talc is mined from mineral deposits that frequently contain asbestos. So far, it has not been determined if the health problems caused by talc are from the talc, or the asbestos, or both. American talc tends to have less asbestos content than French. Like with asbestos, the lungs cannot remove talc. Most diseases related to talc take 20 to 30 years to show up. It is advised that a dust preventative respirator be worn because most damage caused by talc is to the respiratory tract.

TEFLON—dusts from Teflon are respiratory irritants and cause chronic bronchitis. Wear a mask for particulates.

TELLURIUM—fumes generated in copper, silver and gold refining and alloy making; also in welding. Extremely poisonous. Attacks the skin and the gastro-intestinal system. Early symptons are "garlic" breath and a metallic flavor in the mouth. Use good exhaust ventilation.

TIN COMPOUNDS—are harmful in dust form and in fumes. Tin is found in bronze alloys, pewter and solders. Organic tin compounds are skin-irritants. Stanosis is a "disease" caused by dusts of tin oxide that are in the lungs. These dusts are insoluble in lung tissue but are not irritating, do not cause symptoms and do not appear to cause disability. They WILL appear in X-rays of the lungs. However, if inorganic tin compounds are eaten, they can be fatal. Avoid breathing fumes and dust.

TITANTIUM—metallic titanium, as encountered by most metalsmiths, has not been traced to any occupational health problems.

TOLUENE/TOLUOL—is an alternative solvent for BENZENE. Its flash point is 40 degrees F. It can produce intoxication, hallucinations, lung and brain damage and fatal cardiac arrythmyias. Toluol can damage the red blood cells. It should be used with the appropriate ventilation.

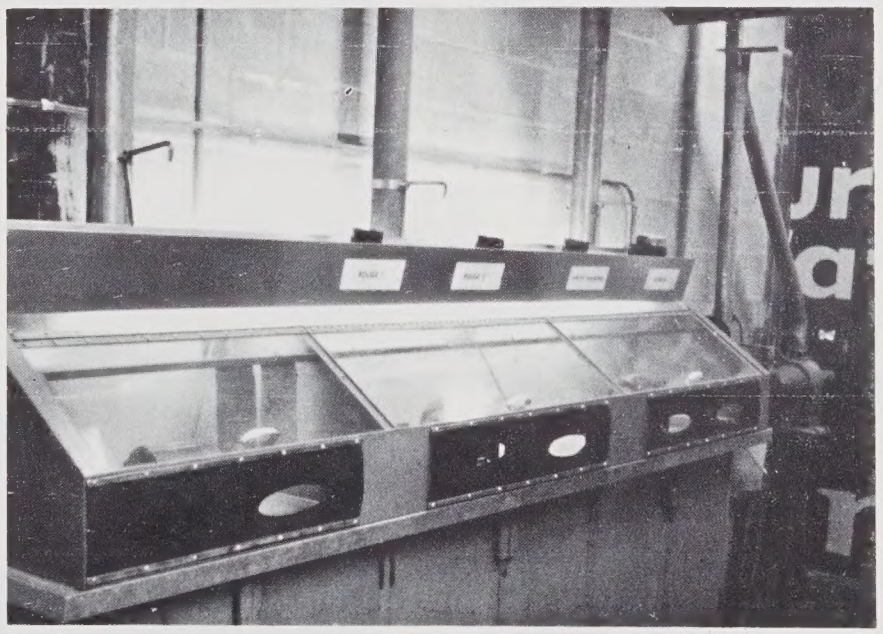
TURPENTINE—is not as flammable as other solvents. It is a skin irritant and harmful to the brain and lungs. Wear gloves and work in a ventilated area.

WAX—many of the waxes that are used for models for casting contain plastics to give them desirable working characteristics. When these waxes are melted for modeling or burnout, the plastics can give off harmful vapors which should be avoided.

XYLENE—alternative solvent for BENZENE. It is a skin irritant; dissolves the fatty tissues; can cause a decrease in the number of red and white blood cells. It is an eye and upper respiratory irritant. Wear gloves and use good ventilation.

ZINC COMPOUNDS—are found in solders and alloys of brass, bronze, German silver and gilding metals. Zinc acetates and zinc oxide are harmful in dusts and fumes. All soldering and welding should be well ventilated. The parts of the body affected are the central nervous system, lungs and skin (dermatitis). Symptoms of zinc oxide fume poisoning are nervousness and depression and metal fume fever. Metal fume fever indications are: flu symptoms, muscular aches and pains, chills, fever, nausea, burning throat, dry cough. This illness is usually very brief with complete recovery in 12 to 24 hours.

Many contemporary metalsmiths also use woods, leather and dyes, photography processes, and numerous machines. The sources listed in the bibliography will cover these and additional materials or processes that I have neglected to include.



Enclosed buffing machines with separate compartments for each compound. Each compartment has exhause ventilation and its own lights. With this type of system there is no need for respirators, goggles, face shields, etc. It is also possible to incorporate filters to trap precious metals.

HYGIENE: IN THE WORKSHOP AND PERSONAL HYGIENE

One of the best ways to decrease or eliminate a health hazard is to find a less toxic substitute. Some substances like asbestos, in particular, are so highly toxic that it is extremely difficult to work with it safely. This rule is true, in general, of all substances that can cause cancer since most current evidence indicates that there is no safe level of exposure to a carcinogen. It would be wise to follow this rule for all harmful substances.

When considering the layout for your shop, try to isolate the location for processes that produce or involve health hazards to one section (room) of the studio, and give this area special attention such as lighting, ventilation, sinks for quick clean-ups, etc.

Good "housekeeping" and personal cleanliness are necessary to control and prevent health hazards in the workshop. Spills should be cleaned up immediately. If the area or substance to be cleaned contains potential health hazards, one should wear gloves and a respirator. When cleaning up dusts, it is preferable to vacuum with an industrial-type vacuum, or wet mop, instead of sweeping.

You should not eat or smoke in the studio. Before eating or smoking, it is advisable to remove work gloves, bandanas, aprons, smocks, etc. Hands should be washed after using toxic substances. (Gentle hand soap is adequate. Harsh detergents can aggravate or cause dermatitis.)

If you live and work in the same place, a separate area should be set aside for your studio. One should be careful not to carry contaminants out of the studio into the living environment and into contact with other members of your household. Children, especially, are much more susceptible to harm caused by toxic substances. Work clothes should be left in the studio, washed frequently and separately from non-work clothes.

It is also important to store all potentially hazardous substances in their original container according to the manufacturer's instructions.

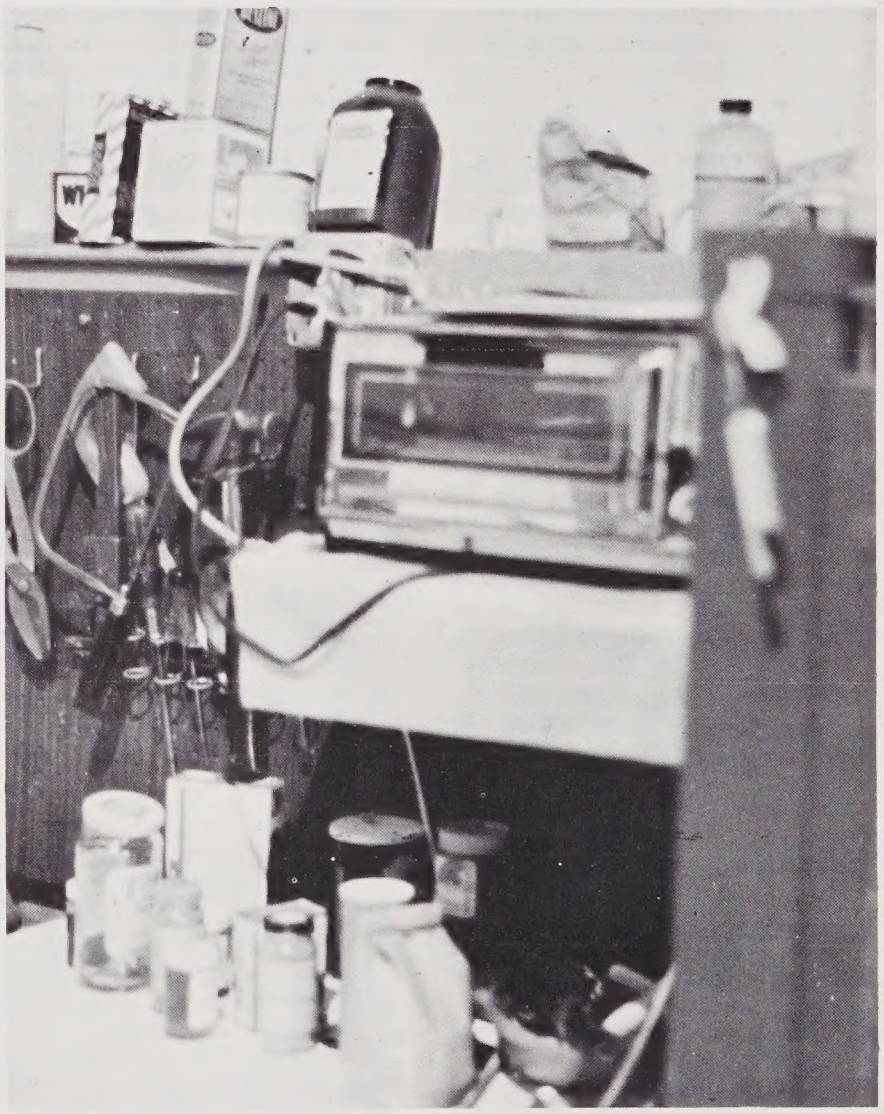


PHOTO A – Food items and a toaster oven sitting under potentially harmful chemicals and next to a work area. These should be isolated away from the work area.

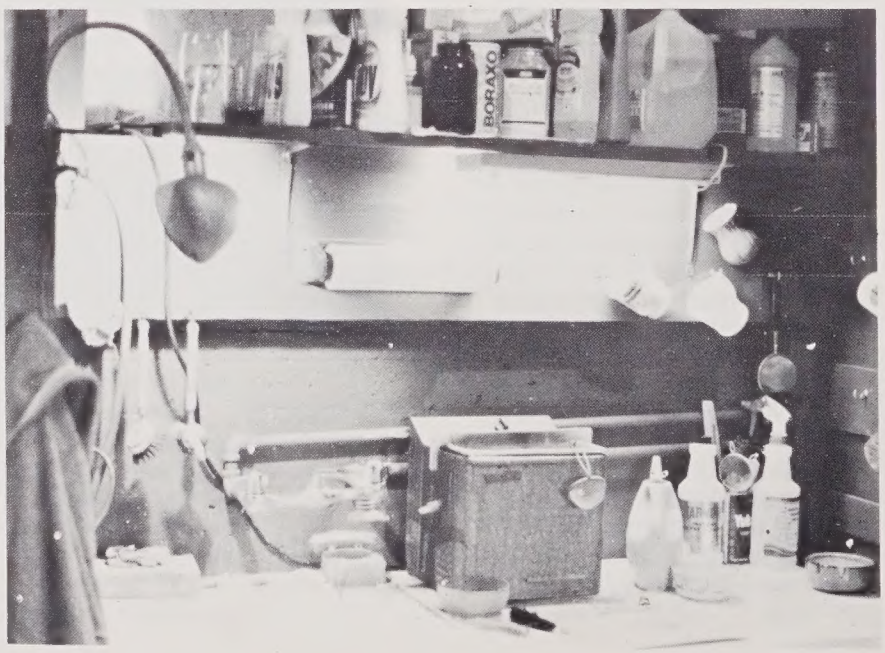


PHOTO B – Drinking glasses are on the shelf. Drinking mugs are on the wall. On the shelf and counter are various potentially harmful acids and chemicals. Eating implements should be isolated away from the working environment.

SAFETY WITH EQUIPMENT MACHINERY

Welding, Soldering and Brazing: Fuel cylinders should be kept free from oily or greasy substances and should not be handled with oily or greasy gloves. Cylinder valves should be closed, and the fuel hoses bled when moving the cylinder and/or leaving the studio.

Cylinders should be marked boldly and legibly as to contents. Unlabeled cylinders should not be used. Empty cylinders should be marked as such at the time of depletion.

Cylinders should be stored in a well-ventilated area, away from heat in excess of 125 degrees F. Cylinders should be maintained in an upright position and should be stored in an assigned area away from any danger of being knocked over. Some type of chaining or bracket is advised for maintaining and securing the cylinder in an upright position.

A leaking cylinder (or valve) or one in need of repair should be marked boldly and legibly and removed to outside and the manufacturer notified. Never test for a gas leak with a flame. Use an approved leak detector solution. These may be obtained wherever you purchase your fuel or cylinder.

Only approved hoses and connections should be used. Hoses should be color-coded: RED=fuel gases and GREEN=oxygen or air. Hoses should be replaced when they leak or exhibit any other defects.

Regulators should only be repaired by authorized and trained personnel, preferably the supplier. Regulators should not be removed until the cylinder valve is closed and the hoses and regulator drained (bled).

All welding, cutting, soldering should be done in a designated area free of flammable conditions and substances. Your shop should be equipped with an appropriate number of portable fire extinguishers.

The physical hazards involved in welding and soldering are: burns and breathing of harmful fumes. In addition, welding produces excessive infrared and ultraviolet radiation. This radiation can cause burns like sunburn to the skin and heat cataracts if eye protection isn't worn. All soldering should be done in an area with good ventilation. Welding requires, in addition to ventilation, protective clothing, eye, and face protection.

METALWORKING MACHINERY

When working with machines, do not wear loose, sloppy fitting clothing. Keep hair tied down and pulled back. Eye and face protection is advisable.

Machines and machine operators should not be positioned in aisles or walkways.

Electrically-powered machinery should be hooked up to an adequate power supply source (proper recommended voltage), and the equipment should be grounded. Wiring should be up-to-date. The studio should be equipped with a "DEAD MAN'S SWITCH" — a button to kill all power to machinery in the case of an accident or emergency.

Grinders and buffers should have appropriate safety guards and local exhause ventilation.

Casting machines should have splash guards around them. Burnout and enamelling kilns should have exhaust ventilation. Looking into a hot kiln without protective glasses or goggles can result in harm from infra-red (heat) radiation. This can cause heat cataracts.

For more specific information regarding metal saws, grinders, rollers, mills, etc., the Department of Labor has print-outs on Safety Standards by the Occupational Safety Standards Commission.

ILLUMINATION

The best indication of whether or not the lighting in the workshop is adequate is whether or not the workers have visual comfort.

Illumination is measured in foot candles and any light meter (like for photography) will measure this.

Machinery and equipment should (according to ANSI standards) be provided with a minimum of 50 foot candles light intensity to fall upon the general area. Fine bench and machine work and fine grinding and polishing will need 500 to 1000 foot candles. This can be obtained by supplementing general lighting with specialized lighting. When natural light is insufficient, artificial light should be provided. Try to avoid lighting that creates glare or casts shadows over the work area.

PROTECTIVE DEVICES

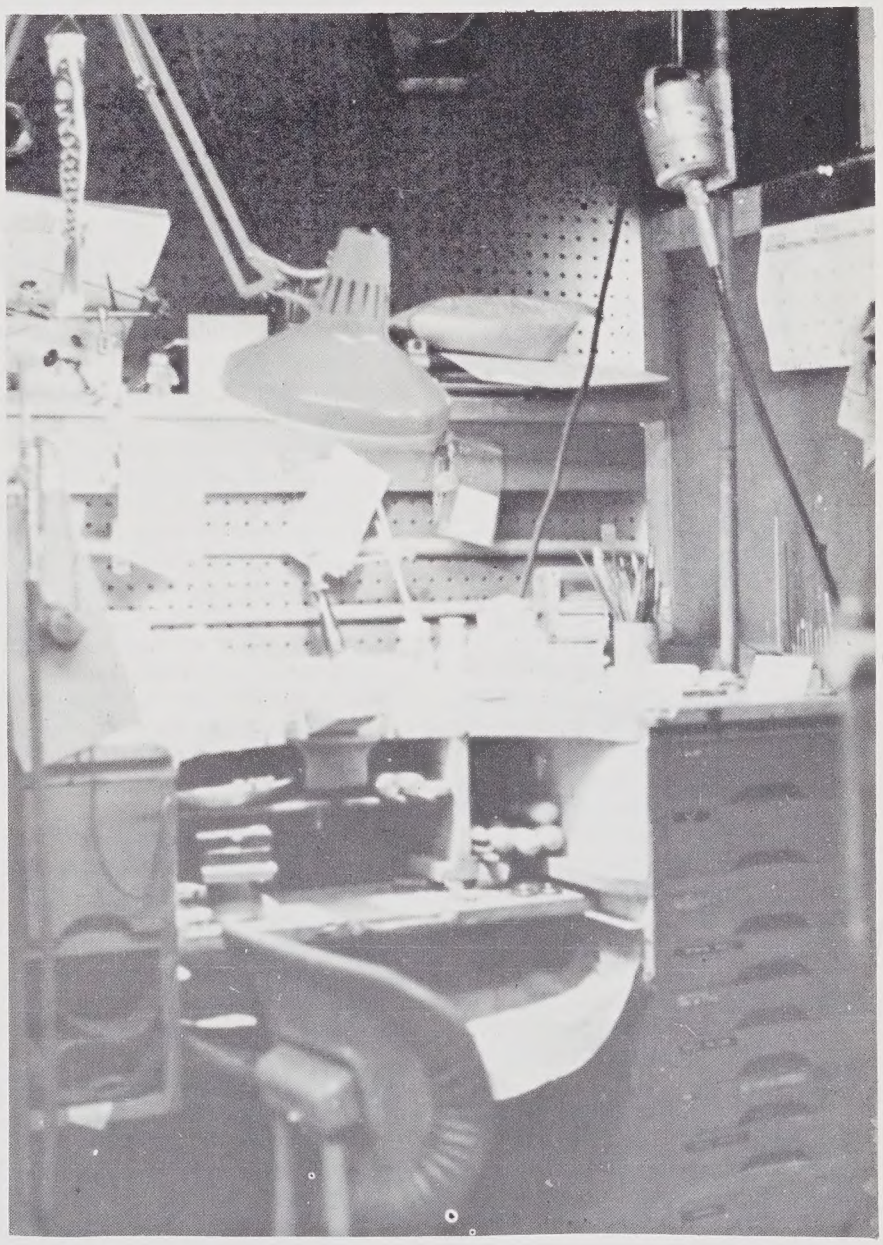
Respirators: According to the Occupational Safety and Health Act of 1970, respirators should only be used for "special emergency situations" where local exhaust ventilation is not possible, or as a temporary measure while local exhaust is being installed. Local exhaust ventilation is more efficient than a respirator, and respirators are uncomfortable to wear and difficult to breathe through.

There are two basic types of respirators: (1) air supplying—which provides a source of uncontaminated air for the person to breathe and (2) air purifying—which includes masks with appropriate filters.

The first type is fairly expensive and is recommended for situations where there is use of flouride fumes and welding of toxic heavy metals and presence of asbestos dust.

Masks and filters, in air purifying respirators, will have to have different cartridges for organic vapors (solvents); acid mists; dusts; and fumes.

Respirators should be labeled that they are approved by the Bureau of Mines or NIOSH (National Institute of Occupational Safety and Health). They should be considered effective only for the particular substances they were made for. It is very important that respirators fit properly and comfortably. Cartridges and filters should be changed regularly.



For further information concerning respirators, consult the American National Standards Institute booklet "Practices for Respiratory Protection", ANSI, Z88-2-1969, available from ANSI at 1430 Broadway, N.Y., NY 10018.

PHOTO C—Typical jewelers bench for soldering and finishing processes. There is no ventilation. The general lighting is very poor, but is supplemented with an excellent workbench lamp that has both a cool flourescent bulb and a 60-watt light bulb. The light fixture also has vent slots to prevent heat build-up, and it can be adjusted according to any convenient position.

VENTILATION—Please note that these are only general guidelines, not the specific information that would be needed to set up proper ventilation. Your state branch of NIOSH can refer you to a specialist in your area.

There are three basic methods of defending against airborne hazards such as dusts, fumes, vapors, particulates: (1) eliminate the hazard at its source; (2) ventilation; (3) protective devices (respirators, goggles). Solutions 2 and 3 seem to be the most frequently applicable solutions for the metalsmith.

One of the most important factors in designing a studio, and one of the most frequently neglected, is adequate ventilation. Basically, there are two types of ventilation: LOCAL EXHAUST ventilation removes the contaminants at their source before they can disperse in the air and enter people's breathing zones; GENERAL or DILUTION ventilation dilutes the harmful substances with fresh air to lower their concentration to a safer level. Obviously, the first method is preferred because it is more efficient in elimination of a hazard.

Some situations that call for local exhaust ventilation: SOLDERING, WELDING, BRAZING, ANNEALING, ACID BATHS, GRINDING, SANDING, POLISHING, KILN OPERATIONS, FORGE OPERATIONS (when indoors), MELTING PITCH, USING SOLVENTS, and WORKING WITH PLASTICS.

A Local Exhaust system consists of an exhaust hood to trap the contaminant, a duct system to carry the contaminant outside, an exhaust fan, and, ideally, air cleaning equipment to prevent contamination of the atmosphere.

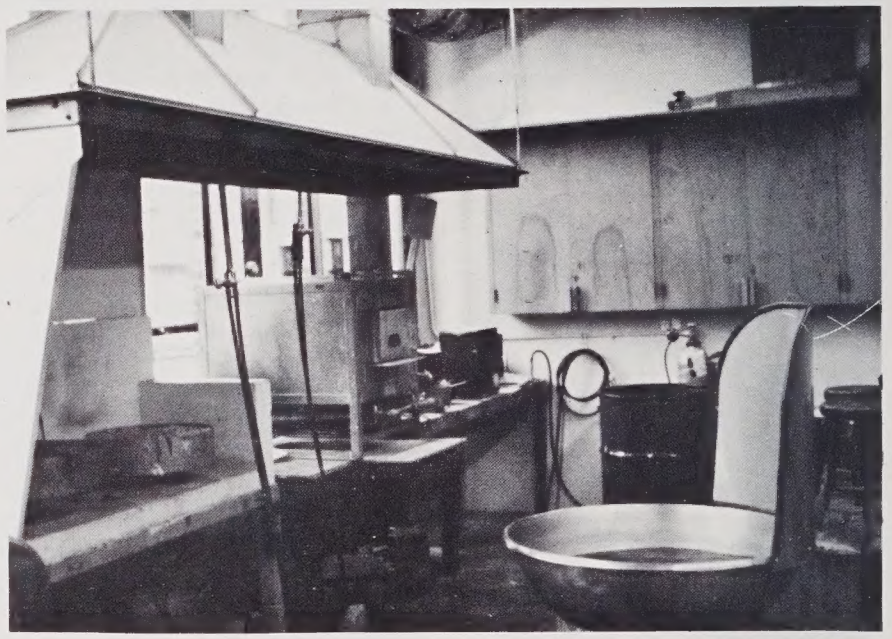
A General ventilation system replaces the air that is drawn out from Local Exhaust. The need for make-up air is frequently overlooked. If exhausted air is not replaced with fresh air, a negative pressure will develop in the room and the local exhaust system will not function properly.

There are many factors that affect the design and placement of an exhaust hood:

(1) The shape of the hood greatly affects its efficiency. It is most efficient to enclose the operation so that only contaminated air is drawn into the vent. On ventilation hoods located near a buffing wheel, baffle plates or lint screens are advisable so that the fans and ducts don't get clogged.
(2) Vent hoods should be located so that the natural velocity of the contaminant will be in the direction of the hood opening. This would pertain to exhaust ducts by buffing wheels and fume hoods above procedures that use heat (soldering, annealing, welding) because hot air rises. Solvent vapors are not heavier than air so exhaust for these fumes should be approximately at the same level that the vapors are produced.
(3) The hood should be placed as close to the contaminant as possible. Velocity of the exhaust decreases sharply as the distance from a vent hood increases.
(4) Hoods should be located so that contaminants are not drawn through people's breathing zones before being trapped in the hood.
(5) Make sure you have provided for an adequate source of make-up air to replace the air that is being drawn out, or negative pressure will result.
(6) The exhaust duct system should be made of materials that won't be affected by the contaminant, i.e., exhausts for organic solvents should be fireproof.
(7) To insure smooth air flow, ducts should be circular in cross section with as few bends in their length as possible. When bends are necessary, make them gradual.

The type and capacity of the fan will depend on the contaminant, the toxicity of the material, the amount in the air and the required air velocity to exhaust that contaminant. All of these variables can be measured.

Regarding these and other technical problems in safety and health hazards, your local state branch of OSHA will be able to help or refer you to another agency who can help.



Both the kiln and the annealing area have separate exhaust systems. Note the large stainless steel bowl and splash guard, this is filled with water *for quenching.*

PHOTO D—All Burnout Kilns should have exhaust ventilation. This type of duct system draws vapors directly from the kiln, it is preferred over the hood type exhaust ventilation.

PHOTO E—To the far left you will notice an alligator clip on the top of the container filled with stripping *solution. In the middle is the coffee pot and tea kettle. On the right is a pyrex pot full of sparex, which is not covered and is not in line with the draw of the exhaust hood.*

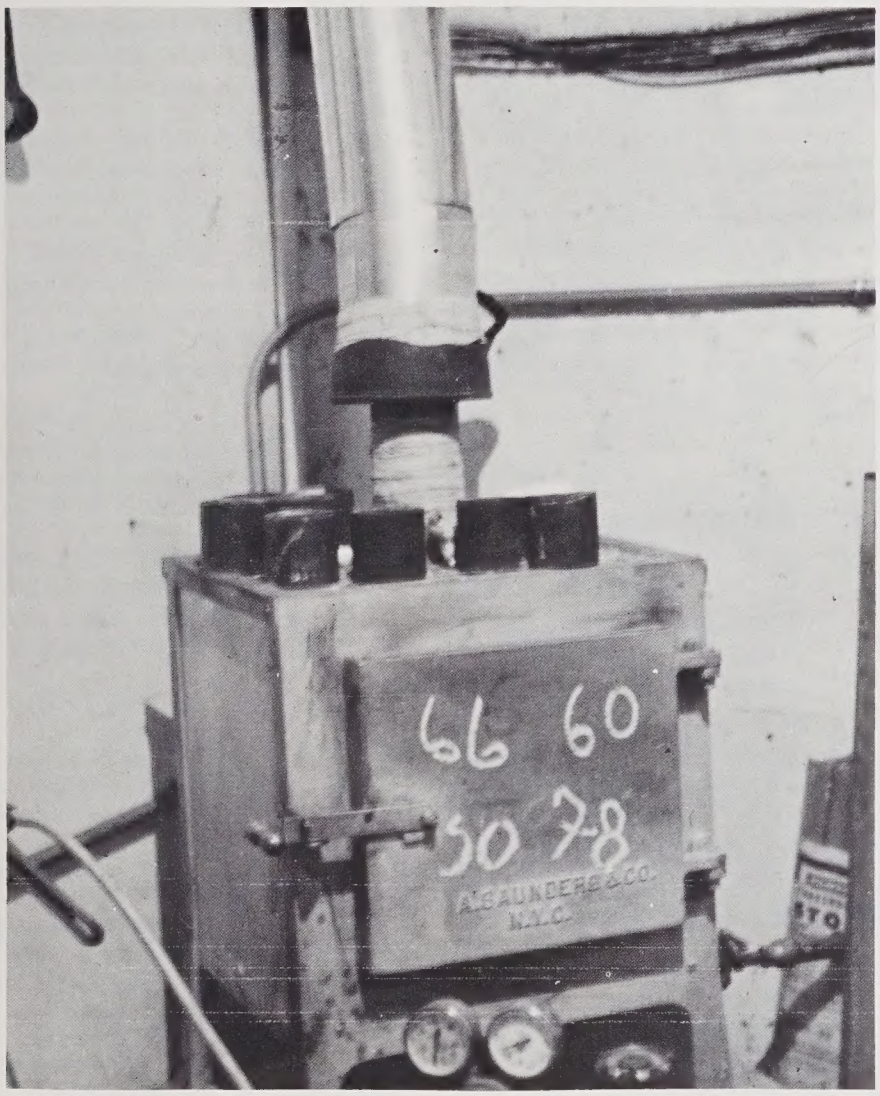
SKIN PROTECTION

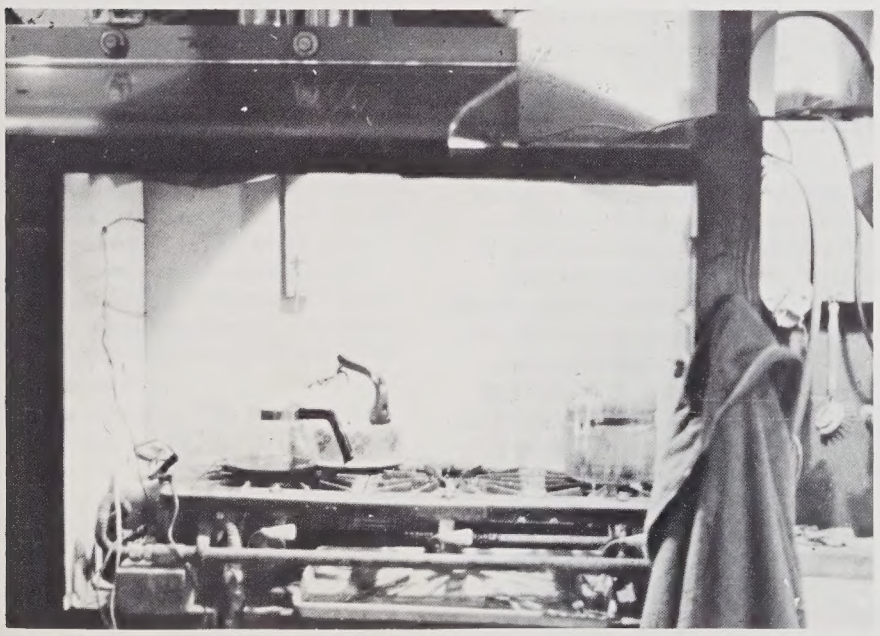
The best way to prevent skin irritation is to prevent skin contact with the irritating substance. The most common area of skin irritation for the metalsmith is the hands. When working with organic solvents, acids and other caustic substances, wearing rubber gloves is adequate protection. Surgical gloves will permit you to still feel the work.

Ketones will dissolve surgeons gloves and other poly vinyl gloves. Neoprene rubber gloves are good for acids and caustics.

Butyl rubber or natural rubber gloves can be used with ketones but not against aromatic hydrocarbons (toluol, xylol, polyester resins) or chlorinated hydrocarbons. Light cloth gloves may be used for other processes when desired. This is advised for the metalsmith who may spend long periods of time holding a vessel for raising and planishing sequences.

Leather gloves can be worn for protection during abrasive processes like grinding, sanding or buffing. Heavy leather gloves are good protection when dealing with heat from kilns, casting and hot pitch/pitch bowls.





PROTECTIVE CLOTHING

Basic common sense will usually guide the metalsmith in appropriate clothing for the studio. It is not wise to go barefoot or wear sloppy garments. Smocks are advisable for buffing and grinding operations. Leather aprons provide good protection when casting, buffing, grinding, and welding. Plastic aprons are good protection against acid splash.

EARS

Not all protective devices provide equal protection. The most protection is achieved from ear muffs. These are recommended for situations where there is a continuous noise level over 95 decibels (like using a drop forge hammer, or in a classroom with several students raising or forging at the same time, most lathes, milling machines). Ear plugs are not as effective. The best of these are the type that will mold to fit the individual's ear. Most reference books suggest that the plugs are more comfortable. It is advisable to try and eliminate most noise at its source.

FACE AND EYE PROTECTION

The face and eyes need to be protected from flying particles from machining and welding, radiation from welding and other heat producing processes, chemical splash, and acid or caustic mists.

Face masks and goggles are designed for each of the circumstances. Models are available that can be worn with or without glasses.

These devices should meet the specifications of NIOSH. For more information, refer to ANSI publication Z87.1, "Practice for Occupational and Educational Eye and Face Protection."

SOURCES OF APPROVED SAFETY EQUIPMENT (NIOSH or Bureau of Mines approved)

Respirators, goggles, aprons, gloves, ear muffs, etc.

Many of these companies have sales offices in other cities.

1. Glendale Optical Co., 130 Crossways Park Dr., Woodbury, NY 11797.
2. Guardian Safety Equipment Co., Box 455, Linden, NJ 07037.
3. Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh, PA 15208.
4. Pulmosan Safety Corp., 30-48 Linden Place, Flushing, NY 11354.
5. Safeline Products, P.O. Box 550, Putnam, CT 06260.
6. 3M Company, 3M Center, St. Paul, MN 55101.
6. Wilson Products Div., E.S.B., Inc., P.O. Box 622, Reading, PA 19603.

These companies will have local distributors in most areas.

NOTE: NIOSH=National Institute for Occupational Safety and Health

PHOTO F–A friend shows a quick alternative.

BIBLIOGRAPHY

1. ACGIH. *Industrial Ventilation–A Manual of Recommended Practice.* American Conference of Government Industrial Hygienists. Secretary-Treasurer, P.O. Box 1973, Cincinnatti, OH 45201.
2. ACGIH. TLV'S – *Threshold Limit Values for Chemical Substances in Workroom Air.* American Conference of Government Industrial Hygienists. Secretary-Treasurer, P.O.Box 1973, Cincinnatti, OH 45201.
3. Browning, Ethyl. *Toxicology of Industrial Metals.* Butterworth and Co. Ltd., United Kingdom.
4. Casarett, Louis J. and Doull, J., Toxicology – *The Basic Science of Poisons.* Macmillan Publishing. New York, NY 1975. $23.95.
5. Cranow, Bertram W., M.D. *Health Hazards in the Arts and Crafts.* Hazards in the Arts, 5340 N. Magnolia, Chicago, IL 60640. Pamphlet cost $1.00. 1974.
6. Gleason, Gosselin and Hodge. *Clinical Toxicology of Commercial Products.* Williams and Wilkins Co. Baltimore, MD. 1976. $54.00.
7. HEW. *Recommended Industrial Ventilation Guidelines.* Publication No. (NIOSH) 76-162. Government Printing Office. Washington, DC 20402.
8. MCA. *Laboratory Waste Disposal Manual.* Manufacturing Chemists Association. 1825 Connecticut Ave., N.W., Washington, DC 20009.
9. McCann, Michael, Ph.D. *Health Hazards Manual for Artists.* Foundation for the Community of Artists, 220 Fifth Ave., N.Y., NY 10001. Pamphlet $2.50. 1975.
10. National Fire Protection Association, Boston, MA. *Hazardous Chemicals Data NFPA No. 49.*
11. Olashinski, Julian B. *Fundamentals of Industrial Hygiene.* National Safety Council. Chicago, IL. 1971.
12. Patty, Frank A., ed., *Industrial Hygiene and Toxicology.* VOL. I (General Principles) $41.50. VOL. II (Toxicology) $64.25. Interscience Publishers. N.Y., NY.
13. Sax, N.Irving. *Dangerous Properties of Industrial Materials.* Van Nostrand Rheinhold Publishing Co., N.Y., NY. 1975. $42.50.
14. Siedlicki, Jerome T., M.S. *The Silent Enemy.* Artists Equity Association, Inc. 2813 Albermarle St., N.W., Washington, DC 20008.
15. Stellman, Jeanne M., Ph.D. and Daum, Susan M., M.D. *Work is Dangerous to Your Health.* Vintage Press. Random House Publishers. New York. 1973. $2.95.
16. Weiss, Linda M. *Health Hazards Encountered in the Field of Metalsmithing and Alternatives for a Safer Working Environment.* M.F.A. Thesis (Adjunct), Cranbrook Academy of Art. Bloomfield Hills, MI. 1977.

NOTE: For specific product information (contents and/or hazards) you can write the manufacturer and ask for a MATERIAL SAFETY DATA SHEET.

UPCOMING EVENTS

EXHIBITIONS

Columbus, OH, Ohio Designer Craftsmen Winterfair '78, Nov. 30, Dec. 1,2,3.

Evansville, IN, 31st Annual Mid-States Exhibition, Nov. 5-Dec. 3, Museum of Arts and Sciences.

Marietta, OH, The 7th Marietta College Crafts National: A Competitive Exhibition of Crafts and Sculpture, Oct. 28-Nov. 26, Fine Arts Center.

Hartford, CN, The Christmas Craft Expo I, Dec. 1,2,3, Hartford Civic Center; The Christmas Craft Expo II, Dec. 8,9,10.

The Elements Gallery, NYC, presents the following exhibits: Jewelry, Etchings—Toni Goessler-Snyder, Oct. 10-Nov. 5; Jewelry—Barbara Mail, Nov. 7-Nov. 25.

Philadelphia, PA, Philadelphia Craft Show, Nov. 16-19, to be held at the Memorial Hall in Fairmount Park.

New Brunswick, NJ, "The Art in Craft," Sept. 30-Oct. 29, to be held at the Mason Gross School of the Arts, Rutgers University.

Toronto, Canada, Canadian Craft Show presents its 4th annual Christmas show and sale, Nov. 27-Dec. 3, to be held at the Exhibition Grounds.

Whitewater, WI, "A Detailed Look," Jan. 17-Feb. 2, 1979, to be held at the Crossman Gallery.

Winston-Salem, NC, "Bodycraft," Oct. 3-Nov. 6, to be held at the Asheville Art Museum.

Greenwich, CN, "The Elements," Nov. 21-Jan. 12, 1979.

Cheney Cowles Museum, "The Container," Northwest Crafts Invitational Exhibition, Dec. 1978.

Tucson, AZ, John L. Biazo, One-Man Show, Nov. 20-Dec. 8, Poma Community College.

St. Paul, MN, The Goldsmith '78, Nov. 8-Dec. 29, sponsored by SNAG in cooperation with, and to be held at, the Minnesota Museum of Art.

Philadelphia, PA, student work of the Bezalel Academy, Jerusalem, Israel, opening Dec. 10 at the Tyler School of Art.

Philadelphia, PA, "Craftsmen '78", Oct. 6-Nov. 5, 1978, Museum of the Philadelphia Civic Center.

London, England, Touching Gold and Silver: 500 Years of Hallmarks, Nov. 7-30, 1978, Goldsmiths Hall.

"Treasures of Early Irish Art", Boston Museum of Fine Arts, Oct. 24-Jan. 21; Philadelphia Museum of Art, Feb. 26-May 27. The exhibition includes some 70 precious objects.

Guilford, CT, Invitational Metals Exhibit, Oct. 1-Nov. 15, Guilford Handcraft Center Shop.

Monterey, CA, California Craftsman Exhibition, Oct. 7-Nov. 5; to be held at the Monterey Peninsula Museum of Art.

Raleigh, NC, 9th Annual Crafts Fair, Nov. 24-26, Scott Building on the N.C. State Fairgrounds.

WORKSHOPS

The Craft Center is presenting 10-week sessions starting Sept. 5, Nov. 13, Jan. 29, and April 9, on: "Enameling", program for beginners and advanced students, $50 for 10 weeks, lab fee $7; "Jewelry Design", basic metalwork techniques, $50 for 10 weeks, lab fee $7.
College credit is available through Clark University, COPACE. For more information, write Craft Center, 25 Sagamore Rd., Worcester, MA 01605.

The following workshops are being sponsored by the American Crafts Council, Washington, DC, Greenwood Gallery and the area universities:
(1) Holloware by Kurt Matzdorf, Oct. 7 & 8,
(2) Stonesetting by Pat Flynn, Nov. 18 & 19,
(3) Problem Solving in Designing Multimaterial Work (and more) by Robert Ebendorf, Oct. 27 & 28, $40 for ACC members, $45 for non-members. For information, Carolyn A. Hecker, Greenwood, Suite 905, 1025 Conn. Ave., N.W., Washington, DC 20036, or call her between 8:30-5:30 (M-F) at 202/833-2880.

San Fernando Valley, CA, Merry Renk—Plique-a-Jour, Nov. 18-19, cost $25; Nancy Monkman, P.O. Box 1311, Reseda, CA 91335.

OPPORTUNITIES

EXHIBITION OPPORTUNITIES

Deadline Date: Dec. 1, 1978; Young Americans: metal/enamel, craftspeople between ages of 18-30. For more information, write Young Americans, American Crafts Council, 44 W. 53rd St., New York, NY 10019.

Deadline Date: Nov. 1, 1978; May 3-6, St. Louis Spring Craft Market. Applications in all craft media will be accepted from craftspersons living in all states except those served by American Craft Enterprises Pacific States Fair and their Rheinebeck event. To write for an application (available in July): American Craft Enterprises, Inc., P.O. Box 10, New Paltz, NY 12561.

Deadline Date: Nov. 1, 1978; May 3-6, 1979, Midwest Wholesale Craft Market, St. Louis, MO. Applications in all craft media will be accepted from craftspeople living in these states: AL, AR, CO, FL, GA, IL, IN, IA, KS, KY, LA, MI, MN, MS, MO, NB, NC, ND, OH, OK, SC, SD, TN, TX, VA, WV, WI, (those not served by the Pacific States Craft Fair and Rheinebeck). American Craft Enterprises, Inc.

Ottawa Christmas Juried Craft Sale, Dec. 7-16 at Ottawa Civic Center, Lansdowne Park, Ottawa. For more information, write: Dan or Barbara Gamble, Box 5709, Station "F", Ottawa, Canada.

GENERAL

Word has been received that the head of the jewelry department of Basalel Academy of Art and Design, Jerusalem, Israel, will be visiting the United States starting November '78. Arie Ofir is anxious to engage in visiting lecture circuits in art schools for a period of six months.

Contact Arie Ofir, Bezalel, 10 Shmuel Hanagid St., Jerusalem, 94592, Israel.

He will also bring with him an extensive work show which will be mounted for display in Tyler School of Art (see exhibits).

INFORMATION

FILMS & SLIDES

Sculpture Techniques, taught by synchronized slide/cassette productions; some available are: Making a Ceramic Shell Mold for Bronze Casting, Vacuum and Centrifugal Casting, Patination Methods and Procedures, Making an R.T.V. Rubber Mold. For free brochure, write: Johnson Atelier Technical Institute of Sculpture, 743 Alexander Rd., Princeton, NJ 08540.

The "Third International Craft Film Festival" will be held Nov. 3,4, and 5, 1978, at the Fifth Ave. Cinema in New York City.

PUBLICATIONS

Centrifugal or Lost Wax Jewelry Casting, Murray Bovin. A thorough and authentic book on all phases of centrifugal or lost wax jewelry casting, $8.95 soft cover; $12.50 hard cover. To order, write: Bovin Publishing, 68-36 108th St., Forest Hills, NY 11375.

Jewels of the Pharoahs, Cyril Aldred. Illustrates and describes the use and significance of Egyptian jewels plus gives history of each piece; paperbound $6.95 (C8257). To order, send check to: The Metropolitan Museum of Art, Box 255, Gracie Station, N.Y., NY 10028.

LECTURES

Nov. 21, 10 a.m., "Gold and Silver Today: England vs. America," Joseph Ordos, professor in dept. of design at University of Minn., sponsored by St. Paul Women's Club and the Minnesota Museum of Art (where it will be held).

PEOPLE

ARGENTUM FUTURI – SWEDISH SILVER GROUP

by Martin Ohman

In June 1976, ten independently working silversmiths decided to form a group and open an exhibition and sales room for unique, handsome silver and gold pieces of highest quality.

The background for this decision was that we wanted to be able to permanently exhibit the pieces we ourselves wished to exhibit. We did not want any jury. Of course, this decision makes great demands upon the craftsmanship of present and of future members, if any. Further, each silversmith faces so many difficulties which we hope to overcome together. We named our group Argentum Futuri. Argentum is Latin for silver.

In the centre of the Stockholm city, we were lucky to find a little store which would suit our purposes well. We opened our gallery, as we call it, in September 1976.

Before the opening of our gallery Argentum, we had summoned the aims of our group into a manifesto (see below), which was sent out to those concerned — like museum people, journalists, potential customers, etc. This manifesto states the desires and aims that we all have in common. Besides, of course, everyone has his absolute creative freedom. Our manifesto attracted much attention, not only in Sweden, but also abroad, especially in Germany where it was published in the professional journal "Gold und Silber." As a matter of fact, it has also been published in the U.S., in a federal American report on European arts and crafts education, written by Otto Dingeldein of Missouri.

Manifesto of the Argentum Group

We are working to promote the following aims:

1. To lay the foundation for developing a high artistic morality and solidarity within the group.
2. To support, as a group, individual discoveries and aims, in order to improve the artistic climate for the art of the Swedish goldsmith.
3. To increase understanding for our work among the broad general public by means of exhibits, lectures, discussions and publicity of our activities. New forms of visiting activities must be tried and taken advantage of.
4. To expand international contact, on one hand with individual artists and groups similar to Argentum, on the other with institutions, organizations, and trade publications, as well as by exchange exhibits.
5. To institute an international periodic prize for the best written work on contemporary achievement in gold and silver.
6. To keep alive the knowledge of the artisans in our profession by running a collective studio where the members can work, experiment and produce more complex creations.

a. We shall not need the recognition of an outside jury. We intend, rather, to work together as a group in order to prepare the soil which will produce work at such a high level that it will convince the general public without having to be labelled "chosen by jury." We want to do our bit in cultivating a richer cultural life. We believe in what we are doing and we believe that even in a highly industrialized society the individual must be able to produce the artefact as an extension of himself. "With his work man must be able to say: This is my time, I do not exist in any other way for myself or for others." (Marx, U Linde)

b. Individual discoveries and aims will be encouraged and supported. This is self-evident if there is to be a rich and meaningful exchange of ideas within the group.

c. There is a need for competent people who can create an interest in our work and spread information about it. Therefore we shall demand that the art research institutions in our universities provide more education in this field, so that in future they will not be satisfied with a mere constant repetition of our 18th century as "the golden age of Swedish silver." We demand that those who judge our work obtain for themselves a more exact terminology. We consider that it is more important for us and the art of the silversmith that any historic projection of our work, which may be desirable in itself, be done against a background of artists from other countries and from the beginning of this century, rather than the inadequate and chauvinistic comparison to the Swedish 18th century.
Owing to habits and needs being changed with the times, it will probably become more usual that a silversmith also works in other materials than the traditional ones (e.g. plastic, glass, other metals). This development will require a broader judgement.

d. We shall be expanding our contacts with such associations as The Goldsmiths' Company, London; The International Society of Goldsmiths, Hamburg; and with European, American, and Japanese organizations and trade publications.
As part of this activity, we wish to invite contemporary masters such as Mario Pinton and Bruno Martinazzi, Italy; Gerda Flockinger and Gerald Benney, Britain; Friedrich Becker and Hermann Junger, West Germany; Yasuhiko Hishida and Hidero Yamahara, Japan; and Stanley Lechtzin, U.S.A.; not forgetting the many Scandinavians, to inform the Swedish public about the position of our colleagues abroad. The view beyond our borders is necessary in this field as in any other; otherwise we begin to think that Sweden is best in the world.

e. We want to contribute towards directing art research into a study of the direct source of contemporary European silver design. It is important for us to know the significance of such artists as, for example, Joseph Hoffman and Dagobert Pesche, Austria; Henry van de Velde, Belgium; Emil Lettre and later Andreas Moritz, Germany, and O. R. Ashbee, Britain. Nor should we forget the artists of the 20's and 30's — Jean Puiforcat and Georges and Jean Foquet, France; and Naum Slutzky of Poland and Britain. These names out of a multitude should be able to interest more art researchers. This is all virgin ground in the science of art. In addition, most of the post-war gold and silver smiths are waiting for their researchers. That is why we need an award to inspire them.

f. At present, there seems to be a flight from the profession, partly of course because many of the older artisans have passed away, and partly because many of the younger generation have left this field due to wage development in industrial and service occupations. A contributory reason has been the cultural-political climate at the end of the 60's, which prevented many people from thinking along silversmith lines. However, today many young people are again becoming artisans. And the number of silversmiths is increasing. With a collectively run workshop we could help to provide both training and practice in both old and new techniques, which are naturally necessary for further development.

This may seem a large and bold program for 10 silversmiths. And, of course, it is. But we view the enthusiastic atmosphere of professional, sincere unanimity which preceded the formation of this group as an ideal launching pad for new ideas. More silversmiths will surely want to join it, but in the meantime, we ten are beginning now.

Gunnar Cyren, Heinz Decker, Marika Dymling, B. Malin Gunnarsson, Carl Gustaf Jahnsson, Rolf Karlsson, Olle Ohlsson, Sigurd Persson, Karlheinz Sauer, Martin Ohman.

Stockholm, September 15, 1976

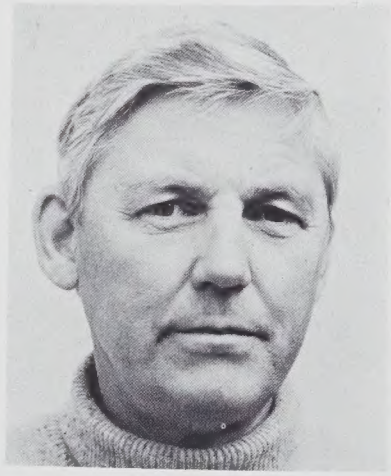
As we said at the end of the manifesto, it may seem a large and bold program for ten silversmiths — since February 1978 we are, however, eleven as Birger Haglund was then elected as a member — but we sincerely hope to be able to realize the cornerstone of our manifesto, namely paragraph 1. Of course, we have had problems — a gallery in the middle of the town is not inexpensive to start; we were no experts of bookkeeping, but had to learn it thoroughly; one member was seriously ill for a long period; besides other practical and administrative problems. However, we have all discussed the problems and dealt with them — and solved them. We have learned to know one another well and most of all, our personal as well as artistic morality and solidarity really have grown.

So far, in our gallery we have only had separate and joint exhibitions of our own pieces, but in 1979 we hope to welcome our first foreign visiting exhibitor. Further, we have taken part in exhibitions in Minneapolis (U.S.A.), in Brussels (Belgium), and in June of this year in Moscow (U.S.S.R.), and in connection with the state visits of our King Carl XVI Gustaf. We have also exhibited at several places in Germany. Moreover, we have received enquiries to exhibit in Australia, Austria and England.

As to paragraph 5, we have been in contact with institutions and societies all over the world concerning the possibility of such an award. Serious interest has been indicated and we aim at laying the foundation for a fund, the yield of which should decide the amount of the award.

There are now more young silversmiths making silver than just a few years ago. However, young artisans have very small possibilities to learn from older ones as there are very few bigger workshops nowadays. We have started to collect tools for a collective workshop and hope to be able to realize paragraph 6 in a few years.

(last row, l. to r.) Karlheinz Sauer, Barbro Ohlsson (3rd row) Gunnar Cyren, Carl Gustaf Jahnsson, Marika Dymling, Olle Ohlsson, (2nd row) B. Malin Gunnarsson, Martin Ohman, Rolf Karlsson, Sigurd Persson (front row) Heinz Decker



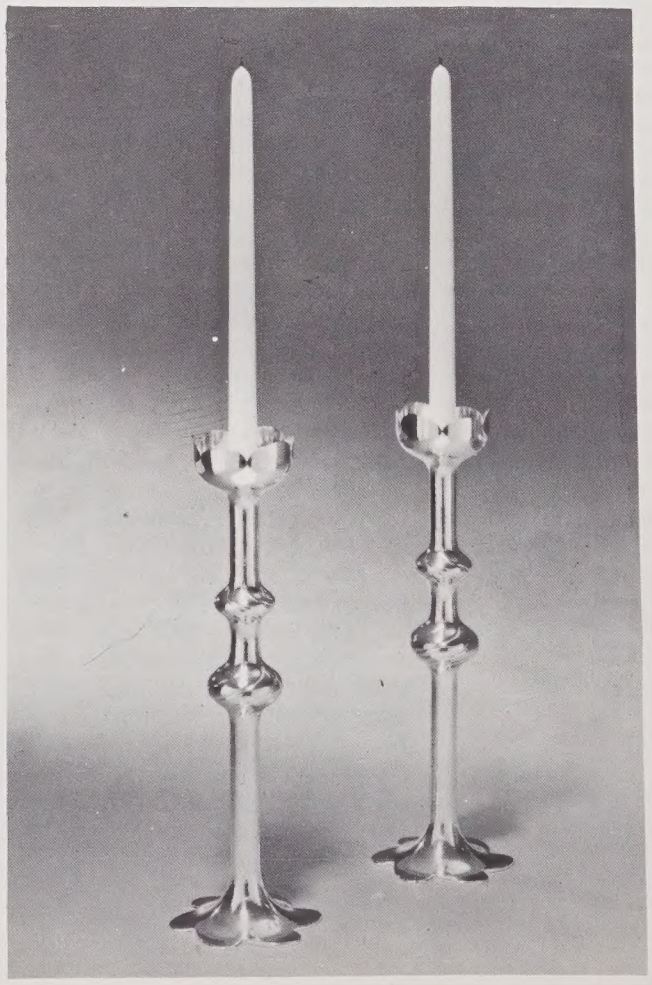
Birger Haglund

GUNNAR CYREN was born at Gavle in 1931. Diploma as goldsmith 1951 and as silversmith 1956. Studies at Kolner-Werkschule 1954. Diploma 1956 from Swedish State School of Art and Design, Stockholm. He has also stayed long periods in other countries for studies. After having obtained the above diplomas, Gunnar soon put his tools aside and was employed as designer by the Orrefors Glassworks in 1959. Ten years later he became its chief of design. In 1970 he became employed by the Dansk Designs Ltd. From 1976 on he has been a free-lance designer of Orrefors and Dansk Designs and in 1975 he set up his own silver workshop at Gavle (200 km north of Stockholm) where he took up the tools he had laid down 20 years earlier. His comeback in silver took place at Argentum in 1977 with 21 heavy bowls, chalices, cups, together with a 2kg heavy bowl of 20k yellow gold. To go with each piece there was a folder with sketches and work descriptions. Moreover, Gunnar had written a declaration of program for his exhibit. After having designed his pieces, he made most of the silverwork himself, whereas part of it was made by another silversmith.

As concerns glassware, Gunnar is represented in most of the important museums of the world. He is represented in the following museums as a silversmith: National Museum of Fine Arts, Stockholm; Rohss Museum of Arts and Crafts, Gothenburg; and the Museum of Gavle.

HEINZ DECKER was born at Idar-Oberstein, Germany, in December 1919, but came to Sweden as a child with his parents. Studied at the Goldschmidesschule in Pforzheim, Germany, 1936-38; silversmith apprentice with the Jeweller's C G Hallsbergs AB; purveyor to H M the King, Stockholm; diploma as silversmith and silver medal 1944. Studied at the Swedish State School for Art and Design, Stockholm, 1945-47; the Kunstgewerbeschule, Zurich, Switzerland, 1947-50; and for the graphic designer Gerhard Miedinger, Zurich. Free studies of art in London and at St. Ives, England, 1950-51. In 1952 Heinz was employed by the Jeweller's C. G. Hallsbergs AB as artistic collaborator and remained with this company until he opened his own workshop in Stockholm in 1961. Heinz' designs and makes plaster models of his silver pieces which are then made by another silversmith. Heinz has specialized in church plate and his work can be found in about 25 Swedish churches. He has also made a lot of corpus works and some jewellery and he won the first prize for corpus work at the "World Silver Fair" in Mexico City in 1974. He has, of course, taken part in several other exhibitions in Sweden and abroad; for example, at Zurich, Copenhagen, Bergen, Trondheim, Stockholm.

Heinz is represented in the National Museum of Fine Arts, Stockholm; the Rohss Museum of Arts and Crafts, Gothenburg; the Museum of Norrkoping; and at the Kunstsamling Lange, Hannover, West Germany. In 1968 he was invited to become a member of honour of the Gesellschaft fur Goldschmiedskunst, Germany, at the annual meeting of which he this year was asked to give a lecture about Argentum. This lecture met with much interest and appreciation.



Gunnar Cyren
Chalice
(far left)

Heinz Decker
(left)

Marika Dymling

MARIKA DYMLING was born in Stockholm in 1940. She studied at the Swedish State School for Art and Design, Stockholm, 1959-65. She was then employed by the Atelier Borgila, Stockholm, as designer during 1965-76. She has simultaneously had her own workshop in Stockholm, Atelier Akiram, for free creative work and industrial design. Marika also concentrates on corpus work which she designs and then lets other silversmiths make.

Marika has taken part in exhibitions at: the National Museum of Fine Arts, Stockholm, 1965; the Hantverket, Stockholm, 1969; London "Boliden Silver" 1969; traveling exhibition to Hanau and Hannofer, Germany, 1971; Den Permanente, Copenhagen, 1972; Atelier Borgila, 1973. Marika also had her separate exhibit at Argentum this spring. Her work had then developed around four motives: skeletons — which are given wings and brought out into the atmosphere — where they become satellite bodies — which are then brought back to mother earth. Marika is represented in the National Museum of Fine Arts, Stockholm.

B. MALIN GUNNARSSON was born at Lund, 1942. Studied at the Swedish State School of Art and Design, Stockholm, 1963-65. She has been working independently in her own workshop in Stockholm since 1966. To be able to do this, she has had different part-time jobs, like driving underground trains and teaching silver work at evening courses. Malin concentrates on jewellery on which she puts small stones. The jewellery she exhibited separately at Argentum in December 1977 were inspired by the sea, the wind and the beach.

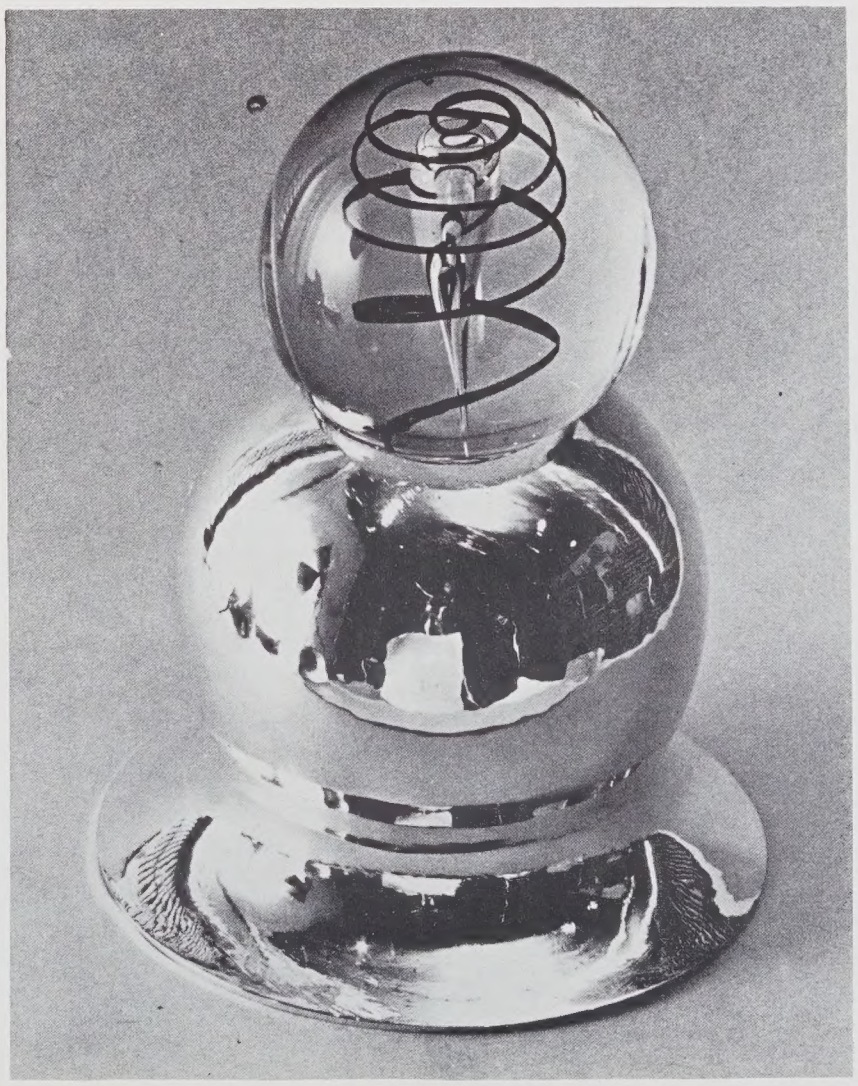
Besides having taken part in different exhibitions in Sweden and abroad (like Zurich, Copenhagen, Bergen, Trondheim, Stockholm) she had separate exhibits at the Nordenfjeldske Kunstindustrimuseum, Trondheim; the Rohss Museum of Arts and Crafts, Gothenburg; the Kunstindustrimuseum, Oslo. Malin is represented in the National Museum of Fine Arts, Stockholm; the Nordenfjeldske Kunstindustrimuseum, Trondheim; the Rohss Museum of Arts and Crafts, Gothenburg.

B. Malin Gunnarsson, sapphire ring

BIRGER HAGLUND was born at Sveg in 1918. During the years 1934-44, he worked as apprentice in different workshops in Sweden; namely: Carl Larsson, Koping; Gronroos, Kristianstad; Atelier Borgila, Stockholm; P Sjoholm, Stockholm. In 1944-48, he had his own workshop in Stockholm; 1948-52 in Johannesburg, South Africa; and then from 1952-71, again in Stockholm. From 1971 to 1976 he worked as advisor to the U.N., first in Afgahanistan and then in Bonaire, the West Indies. From there he brought a lot of stones and black coral with which he had decorated the jewellery that he exhibited at Argentum this spring. Of course, he has been influenced by the years away from Sweden — his jewellery is almost Oriental. He has also been to Italy, Greece, Turkey, Egypt, Iran, Mexico, Equador, Colombia and the U.S. for studies.

In 1977 he opened his own workshop in Stockholm again. During the years 1956-70, he made church plates for about 30 churches in Sweden. He has also made silverware to, among others, the Emperor Hirohito, Japan; and the Shah of Iran. Birger does practically all the work himself. He has had separate exhibits in 1947, 1964, and 1970 in Stockholm; 1948 in Pretoria; 1949 in Johannesburg, South Africa; 1966 and 1969 at Bosjokloster in South Sweden. Birger is represented in the National Museum of Fine Arts, Stockholm, and at the museums of Arboga, Gavle and Norrkoping.

Birger Haglund, "Resting Planet II"



CARL GUSTAF JAHNSSON was born in Stockholm in 1935. He worked as silversmith apprentice in the workshop of Sigurd Persson and obtained his diploma in 1956. Studied at the Akademie fur Angewandte Kunst, Vienna, 1958. Since 1963 he has worked independently in his Studio for Craft and Industrial Design in Stockholm, where he has designed different items from plastic dishmops to silver teapots! He has also been visiting professor at the Stout State University, Wisconsin, U.S.A. He has recently left for Bonaire, West Indies, where he is the successor of Birger Haglund.

Carl Gustaf nowadays designs his silverware and then a couple of other silversmiths make the silver work. Carl Gustaf has taken part in several exhibitions in Sweden and abroad with gold and silver pieces as well as with industrial design. He has had separate exhibits in Stockholm, 1961 and 1967, and of course, at Argentum. He is represented in the National Museum of Fine Arts, Stockholm; the Norrkoping Museum and the Rohss Museum of Arts and Crafts, Gothenburg.

ROLF KARLSSON was born at Atvidaberg in 1947 and is thus our youngest member. Studied 1964-68 at the Swedish Association of Jewellers' and Goldsmiths' School at Stralsnas, where in 1968 he obtained his silversmith diploma, together with the award for best student of the year. In 1968-73, he worked with different silversmiths in their workshops and he also studied drawing at the Swedish State School for Art and Design, Stockholm, as well as sculpture at Perby's Art School. In 1974, Rolf obtained his diploma as goldsmith. He has had his own workshop in Stockholm since 1973. He makes the design as well as the silver work himself. Both his jewellery and corpus pieces are very sculptural.

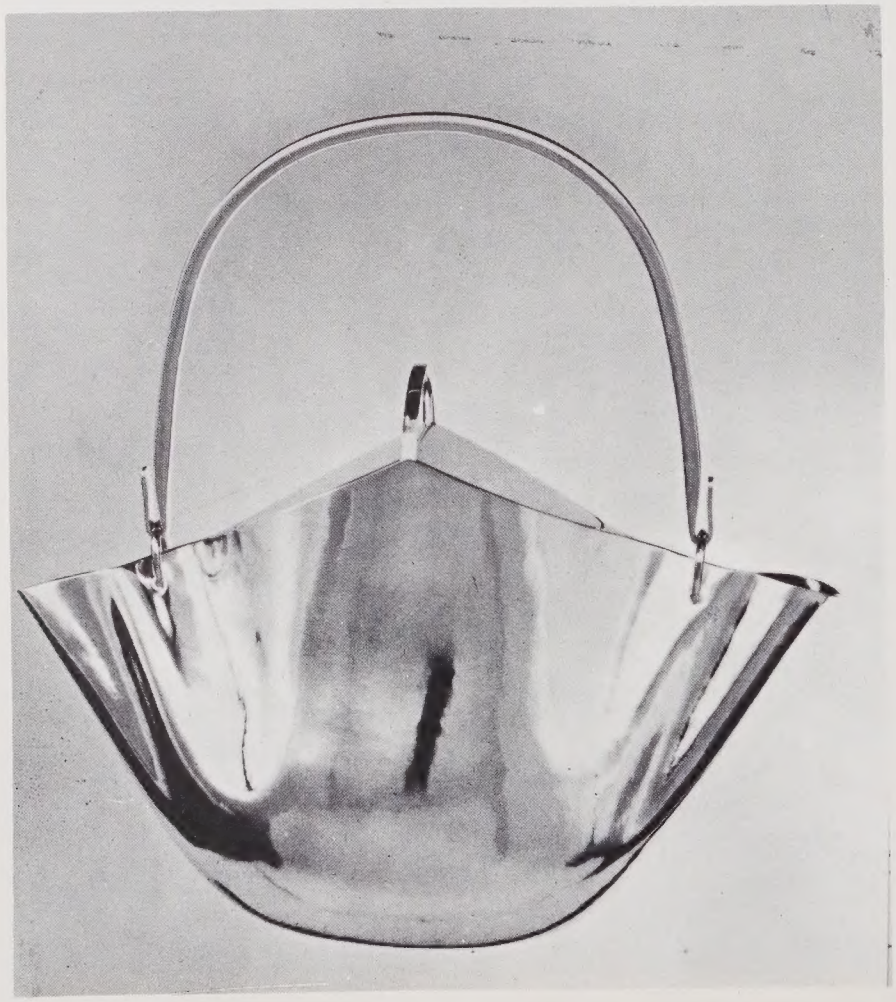
Rolf is too young to have taken part in a lot of exhibitions except for those mentioned above, together with the other Argentum members. He has had some separate exhibits in different towns in Sweden. Besides having made church plate for some Swedish churches, Rolf has also made the candlesticks for the Lutheran Church at Zgierz, Poland.

OLLE OHLSSON was born in Stockholm in 1928. He was apprentice with the Jeweller's C G Hallbergs AB, 1944-49, and was thereafter employed by the Atelje Borgila, Stockholm. In 1954-59 he studied as special student at the Swedish State School of Art and Design, Stockholm. Since 1963 he has his own workshop in Stockholm where his wife Barbro has worked at his side since 1967. During the years 1964-72, he also worked as teacher at the ground school of creative training.

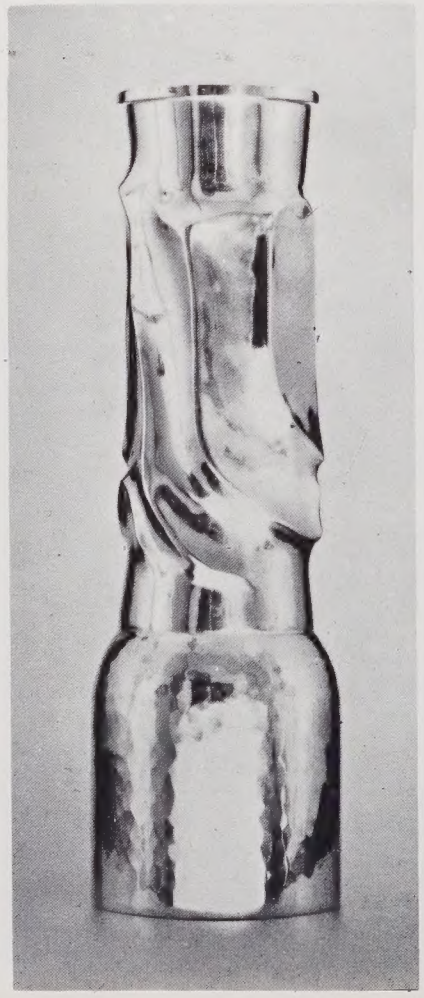
Olle has had several separate exhibits since 1965; among others, Rohss Museum of Arts and Crafts, Gothenburg; Nordenfjeldske Kunstindustrimuseum, Trondheim; Vestlandske Kunstindustrimuseum, Bergen; and at several occasions in Stockholm. Further, he has taken part in many important exhibitions abroad, like the World Fair in New York in 1963-64; the World Fair in Montreal and the jewellery exhibition at Pforzheim, Germany, 1970; the Munich Fair, Germany; and a travelling exhibition to Hanau, Hannofer and Kiel, Germany, all in 1971; at Amersfort (the Netherlands) and Den Permanente, Copenhagen in 1972; the World Silver Fair in Mexico in 1974; at Zurich in 1975; at Copenhagen, Bergen, Trondheim, Stockholm in 1976.

In 1974, Olle obtained the 2nd prize for corpus work and diploma at the World Silver Fair, Mexico City. He has made church plate to some Swedish churches as well as commissions for some public buildings. He is represented in the following museums: National Museum of Fine Arts, Stockholm; Goldsmiths' Hall, London; Varmland Museum, Karlstad; Rohss Museum of Arts and Crafts, Gothenburg; Nordenfjeldske Kunstindustrimuseum, Trondheim; and Vestlandske Kunstindustrimuseum, Bergen.

As can be seen from the above, Olle makes jewellery as well as corpus, though most of his work is corpus. He does everything himself, from the first sketches to the decoration. He experiments a lot and has even used a dentist's burr-drill for decoration.



Carl Gustaf Jahnsson
(far left)



Rolf Karlsson

SIGURD PERSSON was born at Helsingborg in 1914. He worked as apprentice in his father's workshop at Helsingborg and obtained his diploma as silversmith in 1937. Thereafter he studied during 1937-39 at the Akademie fur Angewandte Kunst, Munich, and at the Swedish State School of Art and Design, Stockholm in 1942. He obtained his diploma of master in 1943. He has his own workshop in Stockholm where some silversmiths are employed. He works as gold and silversmith; however, nowadays merely as designer, as sculptor, as industrial designer and since 1968, as designer of glass for the Kosta Glassworks.

Among all the separate exhibits Sigurd has made, the following are the more important ones: 1956 in Havana, Cuba; 1957 at the Nordenfjeldske Kunstindustrimuseum, Trondheim; 1959 at the Kunstindustrimuseum, Oslo; 1960 in "68 Rings" at Libertys, London; 1964 in "The Eloquent Jewels of Sigurd Persson" at the Georg Jensen Inc., New York; 1966 jewellery exhibition in Brussels and Monaco; 1966-68 traveling exhibition to 11 museums in Sweden; 1969 "Bowl" at Goldsmiths' Hall in London; 1973 "Plastiken und Schmuck" at Braunschweig, Germany; 1975 exhibition of glass at Illums Bolighus, Copenhagen. He has, of course, also taken part in many exhibitions in Sweden as well as abroad, for example: Australia, U.S.A., Brazil, The Netherlands, Portugal, Italy, Switzerland, Belgium, France, Germany, Iceland, Finland, Denmark, and Norway.

Sigurd is represented in the National Museum of Fine Arts, Stockholm; Rohss Museum of Arts and Crafts, Gothenburg; museums of Malmo, Norrkoping, Helsingborg, Sundsvall, Varmland, Oslo, Trondheim, Bergen, Zurich, Stuttgart, as well as in the Museum of Modern Art, New York.

Awards, among others, that Sigurd has received are: diploma of honour at the Trienal of Milano 1951, and its silver medal in 1954, 1957 and 1960; the golden ring of honour 1955; 1st prize in a competition for a stainless steel set of eating implements for SAS in 1959; gold medal and two marks of honour at the 1st Bienal of Ljubljana 1964; and in 1966 two marks of honour at the 2nd Bienal. Further, in 1967 he received a lifelong artistic reward from the Swedish State. Sigurd Persson was the 1965 member of honour of The Worshipful Company of Goldsmiths, London; and 1970 and 1971 member of the jury of Diamonds International Awards, New York.

Olle Ohlsson

Sigurd Persson,
sugar casters, silver

KARLHEINZ SAUER was born at Pforzheim, Germany in 1943. He studied at the Goldschmiedeschule, Pforzheim, 1958-61, and at the Kunst und Werkschule, Pforzheim 1962-65. About 10 years ago, he moved to Sweden, Vasteras, where he started his own workshop. Since 1968 he has had several separate exhibits in Sweden. Further, since 1972 he has taken part in many exhibitions abroad; for example, Deutches Goldschmiedehaus, Hanau; Reuchlinmuseum, Pforzheim; Internationale Schmuckschau in Munich; Den Permanente, Copenhagen; Binghampton, U.S.A.; Los Angeles, U.S.A.; Museum Bellerive, Zurich; Kunstindustrimuseums in Copenhagan, Bergen, and Trondheim; and, of course, in Stockholm and Gothenburg.

Since the 12th century, Vasteras has been one of the biggest towns in Sweden and it is still of great cultural and economical importance. In the old and most charming part of the town, Karlheinz has his workshop where he makes everything himself, in jewellery as well as corpus. Karlheinz has made the church plate for some churches at Vasteras and he is represented in the National Museum of Fine Arts, Stockholm.

Karlheinz Sauer

MARTIN OHMAN was born in Lycksele, in the very northern part of Sweden, in 1929. He studied at the Swedish State School of Art and Design, Stockholm, where he obtained his diploma in 1951. Having obtained his diploma, he went back to Lycksele and ran the jeweller's shop that his grandfather had started in 1885. He did so until 1970 when he moved to Halmstad in south Sweden where he opened his own workshop "The Silver House." Martin is also one of the few silversmiths nowadays who makes all the work himself.

He has taken part in exhibitions in Sweden and abroad; among others, the Bellerive Museum, Zurich; National Museum of Fine Arts, Stockholm; Rohss Museum of Arts and Crafts, Gothenburg; Kunstindustrimuseet, Copenhagen; Vestlandske Kunstindustrimuseum, Bergen; Nordenfjeldske Kunstindustrimuseum, Trondheim. Further, Martin has made the church plate for more than 30 churches all over Sweden. He is represented in the National Museum of Fine Arts, Stockholm.

Martin Ohman

Galleri Argentum, retailing department and showroom

Well, at least you know a little about us by now.

When forming our group we naturally posed the everlasting question: Will people buy our silver? At the end of the 60's silver was regarded as unnecessary luxury, as we mentioned in our manifesto. Plastic was cheaper. However, this trend has changed somewhat. Plastic is still cheaper, but at least some people have found that plastic is not silver. Though, of course, we will certainly not become rich making unique silver pieces. The Latin proverb "Navigare necesse est, vivere non est necesse" could be translated to "Making silver is necessary, living is not necessary", at least for us.

Considering Argentum's short existence, we have succeeded in animating the art of silver in Sweden; in creating a debate; in making journalists write about silver. As an example, in connection with our exhibits we have openly declared who has designed and who has made the silver pieces. This has resulted in a journalistic debate and less secrecy from other silversmiths. Actually, during 1977 more has probably been written about the art of silver than ever before in Sweden. In the Swedish trade publication for design "Form", Helena Lutteman (Curator at the Dept. of Applied Arts, the National Museum of Fine Arts, Stockholm) wrote in her review of arts, crafts and design at the end of 1977: "A manifest tendency is that different materials—within the arts and crafts sector—stand out to be dominating different years. In 1977 we will start with the silver, as it is felt to be strongest." Then she wrote about the separate exhibits of eight silversmiths, of which six belong to our group.

We are very happy and proud to say that our exhibitions have attracted much attention from professional people, have been well visited and have sold very well — not the least important fact.

EDITORIALS

WE ARE YOU!

by Mark Baldridge

As most of you are aware, SNAG is experiencing financial problems due to increased Journal costs. As a SNAG member and Journal subscriber our problems are your problems.

Due to the efforts of a devoted group, our organization will continue — the question is, "at what level?" We are currently operating at a bare minimum and are exercising extreme frugality. Now, we must ask you to do likewise. Please—do not telephone us collect; have patience if your Journal doesn't arrive on time. Wait an additional two weeks before writing; and if you must write concerning a problem or request, include COMPLETE information and a check, when appropriate.

The Journal and SNAG dues operate under an "honor system". Taking advantage of this system will only hurt you, because SNAG is you, not some vast bureaucratic organization in the sky. If you sign up as a student member, request a back issue you didn't receive, etc., we assume you are being honest. Please don't let us be disappointed. If our expenses overtake our income, SNAG and the Journal shall cease.

I realize our dues seem quite high to many; however, we ask you to bear with this — it's the Journal's base of support. The only consolation I can offer is that I, too, must pay $75 a year to receive my six copies!

The Journal staff is in the process of launching a major advertising campaign which in two years should produce enough revenue to publish the Journal in its entirety. That is, providing our campaign is successful. Again, we need your help. The collective energy of SNAG membership can be a vital and powerful force. Let's use it. EVERYTIME you place an order for metal related supplies, include a special note asking that they advertise in the Journal (include our address). Then follow up by supporting those companies who are advertising with us, versus those who are not, and/or drop the company president a simple note of appreciation. Advertising is a major strength (or weakness) of any publication. We would like to see the Journal become strong.

Let me conclude by thanking those members who have asked their school libraries to subscribe. Because of this, we have already received several letters of inquiry from individuals who were excited to discover SNAG. If you have not contacted your library, I urge you to do so. Help us, sc we can better help you.

Remember—we are you!!

EDITOR'S NOTE: Because of the variety and nature of the Letters-to-the-Editor, SNAG and the Goldsmiths Journal cannot verify or be responsible for the material these letters may contain. It is therefore suggested that you carefully analyze and verify all information herein. We shall consider publishing responsible letters which refute any information we publish.

TO: Heikki Seppa, Sally Wehrman, John Baltrushunas, Anne Taussig, and SNAG Board Members:

Back in Finland, the St. Louis SNAG Conference has taken on the golden glow of a fabulous memory. Did it really happen? Of course, I know it did, and I cannot tell you in words how much pleasure it gave Saara and myself to be there. First, the setting was so pleasant. Then the sequence of events were so well orchestrated—they passed by with a symphonic flow, though all too quickly. Often I had the impulse to say, "Let's have a rerun".

I am fully aware that no such operation involving so many people and events could have occurred without a *staggering* amount of planning, down to the delightful detail of cheese and crackers served in your workshop, Heikki. For all this, my congratulations to you on your outstanding organizational ability, and also to your "staff" for a job extremely well done.

For me *all* of the presentations were provocative and interesting. But there was another side to the whole experience that was equally rewarding. That was the opportunity to meet, and attach faces and personalities to all those "names" with whom I have had contact only by mail. Their work has taken on a new dimension for me, seen in this reference, though the work itself still remains the last word. Also delightful was the chance to meet so many other members of the "family" from such a widely diverse geographic distribution in the U.S.A., and to make new friends. I sincerely hope that this contact is only the *beginning* of such a friendship, and that some of you at least will continue it in Finland. Our welcome mat is out to any and all of the SNAG family brave enough to make the voyage to the edge of the world.

I would like to make a couple of suggestions that might be considered for use in future conference. I noticed that many people had brought slides of their work with them, and were passing them around to be seen by others only by holding them up to a light source. I, for one, would have *loved* to look at *all of those slides.* So, perhaps, would other people at the conference. Would it be possible to schedule a *specific time* during a conference — say an evening — during which a room, slide projectors and screens would be available for use by anyone attending the conference to show the slides they have brought, to whatever audience that cares to see them? This idea, I think, would serve one of the purposes of such a conference, which is to become acquainted with each other's work and ideas.

Though I tried to meet as many people as I could, I feel I missed several opportunities simply by not initially knowing who was who, even though name buttons and a participant's list were thoughtfully provided. Would it be possible, at the very beginning of the first meeting, to have each person present stand up in order and become identified to the audience simply by giving his/her name and place of origin, while someone followed these self-introductions with a microphone to assure that they are audible to all? This could generate a whole series of possible encounters and exchanges which might otherwise not happen. The entire procedure should take no more than 10 or 15 minutes at most.

All thanks and good wishes to you, Heikki, and to all the members of SNAG, as wonderful, exciting, friendly, and talented a group of people as ever existed anywhere.

Oppi Untracht

Dear Editor,

I just received this letter from a Ghanan goldsmith seeking employment — perhaps you could print this letter since he sounds very competent and interesting . . . metalsmiths of all nations, let's all smith in unison!

Hannelore Gabriel

Dear Sir,

I would like to inquire about employment possibilities . . . I am 36 years old . . . I specialized in gold and silversmithing at Kumasi, Ghana College of Art . . . I received my diploma from the School of Applied Arts (Kunstgewerbeschule) Zunich, Switzerland . . . I have worked as a goldsmith in Switzerland, Japan, and Ghana.

I had my own workshop in Ghana but the government has decided not to sell any more gold to goldsmiths in Ghana since they want to export the metal for foreign exchange.

If I am given the opportunity to work, I hope to bring new ideas in your jewelry design.

Kwabena Sarpong
UPO Box 111
U.S.T. Kumasi, Ghana

Dear Editor,

In response to Christin Throwers' question, "Is there any eye protection (goggles, etc.) that will not fog when also wearing a dust mask (particulate mask)?"—

Write to American Optical, P.O. Box 3349, Rincon Annex Station, San Francisco, CA 94119. This is a manufacturing company. They will tell you of a distributor in your area. They make an ANTI-FOG lens goggle/glasses. If possible, you could consider improving the studio situation so that a particulate mask would be replaced with a ventilation system. Also, you could try wearing a particulate mask that has a knit cotton liner/sealer which will absorb the moisture and be kinder to your skin (they have a cotton sleeve).

Basic information about ear protection can be found in my technical paper where more elaborate information can be found through sources in the bibliography. I am currently doing some research on noise reduction methods with an acoustical engineer. When the results are completed, I will send the information to the Journal.

Linda Weiss

(Editor's Note: Linda Weiss' technical paper is inserted in the middle of this Journal.)

ORGANIZATIONAL NEWS

NEW MEMBERS

We would like to welcome the following new members:

LIBRARY
Newcastle College of Advanced Education, Canada
Ontario College of Art Library, Ontario, Canada
University of Akron, Akron, OH

STUDENT
Ken Coleman, Richmond, VA
Patrice Dohnalek, Madison WI
Sidney Furlong, Ogden, UT
Scott Hilty, Fremont, OH
Nanci Kappel, Bedminster, NJ
Jill Kubica, Long Beach, CA
Keith Alan Lewis, El Paso, TX
Jane Martin, Philadelphia, PA
Susie B. Robbins, Farmville, VA
Kim Root, Brookline, MA
Billie Theide, Des Moines, IO
Jane Dauchy Wiemer, Shaker Heights, OH

ASSOCIATE
Linda Allen, Duarte, CA
Binnie Birstein Reichgott, Rochester, NY
Whitney Boin, New York, NY
Douglas Carivet, Edmonton, Canada
Joyce Clements, Berkeley, CA
Kathleen A. Flowers, Ballwin, MO
M. A. Forgues, St. Lazare Co. Bell, Quebec
Kenneth Kalman, E. Hampton, NY
Gene Kerley, San Angelo, TX
Daniella Kerner, Melrose Park, PA
Robin Koeing, Basking Ridge, NJ
Michael Kovick, Millwood, NY
Blythe Kupferberg, Glencoe, IL
Marc Levine, Jamaica Plain, MA
Gerald Mickle, Lopez, WA
Ann-Marie Montecuollo, Berkeley, CA
Diane Roberts, Alexandria, IN
Samuel Rosenthal, Philadelphia, PA
Binx Selby, Boulder, CO
Roland Shack, Tucson, AZ
Alice Sprintze, Syosset, NY
Polly Stehman, Edmonds, WA
Herbert Wohl, La Jolla, CA
Sylvia Youell, Milwaukee, WI
Fred Zutanern, Rogus, AR

PRESIDENT'S COLUMN

As I sit to write this letter, Bill Neumann has just returned from his trip to Boston where he spent two days with Joel Bagnal going over the office procedures to effect our location change. Our main office will now be: SNAG, 8589 Wonderland N.W., Clinton, OH 44216; phone: 216/854-2681.

Our organization has grown so tremendously in the last few years. When Joel took over as secretary/treasurer, the system which was established for our 250 members to keep track of dues payments, changes of address, answer inquiries, and typing or duplicating for SNAG's various programs, just became more and more difficult to manage. Going to computor was seen as the only way, and after quite an effort, this has now been accomplished.

The Society owes a great deal to Joel Bagnal for his many, many contributions over these several years. It is not always a very rewarding job, keeping lists of names and billing colleagues — no thanks are received when all works smoothly, just plenty of gripes when mix-ups are made. I would like to take this opportunity to thank Joel for all he has done, and to wish him much continued success in his business.

At the same time, however, I must state that all is still not as smooth and comfortable as we desire. SNAG, along with all of us, is being hit with inflated costs and at the same time our increased membership is requesting more in services. I feel there are definite benefits which an organization like ours can bring for our field; many of our colleagues feel likewise and have volunteered to help in various ways. I can only ask that you all bear with us now. We are at a point where, if we are able to straighten out our fiscal and organizational problems, we can really start sailing. New ideas and energies are coming to us. There are so many good things which we could do, but it will take a combined effort of more than a few. Being a member of SNAG should be more than subscribing to a magazine; it is your professional organization. I am asking you all to get involved; make this really YOUR organization. In addition to paying your dues, we need your ideas; send them to the JOURNAL, or a board member. Talk to your suppliers about advertising in the JOURNAL; maybe even volunteer to help with something!

In this issue, our center-fold features our current constitution and by-laws. There was some discussion in St. Louis about possible revisions and three members volunteered to look into the matter and report to the Board with suggestions for changes. Should any of you have suggestions, please send them to one of these people: Richard Mawdsley, School of Art, Southern Illinois University, Carbondale, IL 62901; Bob Mitchell, 1817 Colonial Rd., Jonesboro, AK 72401; Marc Paisin, 2710 Haste St., Berkeley, CA 94704.

Any changes would, of course, need to be voted on before being adopted.

And, lastly, you might keep the middle of April open on your calendars. Tentative conference planning is pointing toward April in Boston—1979. It was good to see so many of you in St. Louis; let's really make Boston another fine gathering. Suggestions most welcome!

Mary Lee Hu
Art Dept., Michigan State University, East Lansing, MI 48824

MEMBERS NEWS

Kim Bass was in "Coast to Coast," an invitational show held at Spring Street Enamels Gallery in NYC.

Mark Baldridge, Jaclyn Davidson, Debra Lynn Gold, Marcia Lewis, Betty Helen Longhi and C. James Meyer are participating in "Bodycraft" at Asheville Art Museum.

Frial M. Blumenthal held a lecture on her artistic background and jewelry at the Renwick Gallery.

Nelsie Davis was elected to the board of the Contemporary Crafts Gallery, Portland, OR.

Beverly De Jong won the Eaton Award for the Best Original Design in Metal Jewelry for "Space God," a neckpiece. She also won the Royal Trust Corp. Award for excellence for "Space God."

Karen Ehrhardt had a piece purchased through the Fred Snowden Memorial Fund for the Oakland Museum permanent collection.

Alan Feinstein won first prize in Jewelry/Craftsman '78, held at Philadelphia Civic Center on Oct. 6-Nov. 5.

Hannelore Gabriel's work was exhibited during the month of Sept. in the Ohio Craft Invitational Show in Mansfield, OH.

Bill Harper held a workshop on enameling Aug. 21-25 at California State University.

Kurt Matzdorf sponsored a lecture on The Silversmith in Today's Society at the Corcoran School of Art.

Richard Mawdsley has accepted a position at Southern Illinois University in Carbondale.

Barry Merritt gave a workshop at the Central Region Conference at Humber College in Ontario, Canada, with Hero Kielman, coordinator of Humber's Metal Arts program and the conference chairman.

Elliott Pujol had a show on Copper Forms from Aug. 29-Sept. 24 at the Sheldon Memorial Art Gallery, U. of Nebraska/Lincoln.

Mary Ann Scherr is a member of the distinguished panel of jurors who selected the craftsmen who will be participating in the 2nd annual Philadelphia Craft Show. She will also begin teaching at Parsons this year.

Linda Weiss has had three of her vessels selected for the California Craftsmen exhibition at the Monterey Peninsula Museum of Art. She also received an award for one of the vessels.

Ginny Whitney, Thomas Mann, Pahaka, Lee Peck, Thomas Sandretto and Francis Welles have been selected to participate in the 2nd annual Philadelphia Craft Show.

SNAG HAS MOVED

Following Joel Bagnal's resignation as secretary/treasurer of SNAG and the election of William Neumann, SNAG has moved to Ohio. Please address all bills, inquiries, etc., concerning SNAG to: Bill Neumann, SNAG, 8589 Wonderland N.W., Clinton, OH 44216.

SNAG AUDIO VISUAL SERVICES

When a person submits a portfolio and is accepted as a professional member, that group of slides becomes the basis for the major part of our rental library. The sets are kept up-to-date by the member on a regular basis. The sets are catalogued by individual in separate carousels. Three copies of each set are available for rental.

RENTAL FEES: Pro-member, $2 (postage costs); Associate and Student, $7 ($5 rental, plus $2 postage).

AVAILABLE SETS (Individual)	NO. IN SET
Abramson, Maurice	36
Adams, Jay	20
Arentzen, Glenda	32
Armstrong, Roger	20
Bagnal, Joel	20
Baldridge, Mark	19
Bennett, Jamie	43
Bernstein, Bernard	25
Blodgett, Peter	20
Coffin, Doug	20
Daunis-Dunning, Patricia	32
Davidson, Jaclyn	29
DeJong, Bev	38
Dispasquale,	20
Evans, Chuck	24
Evans, Gerry	27
Fenster, Fred	8
Fossee, Jackie	23
Fisher, Robert	25
Fisch, Arline	20
Fix, John	20
Gabriel, Hannelore	40
Getty, Nilda	20
Gold, Debra	20
Hanes, Drewry	20
Helzer, Richard	28
Hentz, Chris	20
Hu, Mary	51
Johnson, Don	20
Keens, David	20
Kielman, Hero	20
Kuehnl, Claudia	25
Larson, Gail	20
Lewis, Marcia	58
Link, Val	40
McLean, George	51
Mafong, Richard	20
Malenda, Jim	35
Markusen, Tom	35
Marshall, John	40
Martin, Eric	20
Matsukata, Miya	5
Matzdorf, Kurt	40
Mawdsley, Richard	46
Meyer, Jim	26
Michaels, Eunice	22
Mitchell, Robert	20
Morton, Phillip	21
Moty, Eleanor	20
Muller-Stach, Dieter	20
Mergen, Paul	20
Montgomery, Robert	10
Myers, Paulette	32
Mazurkewicz,	20
Neimi, Edward	41
Neumann, William	20
O'Connor, Harold	80
Paley, Albert	77
Paul, Natalie	23
Peck, Lee	20
Pijanowski, Gene	24
Pijanowski, Hiroko	26
Pijanowski, H & G	31
Pimentel, David	20
Phillips, Carol	22
Renk, Merry	20
Ross, Hal	30
Scherr, Mary Ann	29
Seppa, Heikki	23
Schwarcz, June	20
Shirk, Helen	27
Smith, Jo-An	32
Sandreeto, Thomas	20
Snyder, Toni	26
Soellner, Mitsuko	20
Soellner, Walter	20
Spavins, Mary Ann	19
Spivak, Laurie	20
Steakley, Douglas	20
Skoogfors, Olaf	20
Small, Carol	20
Tawa, Roger	23
Trunkfiels, Mona	28
Vallane, Oli	25
Watson, Lynda	37
Woell, Fred	80
Zilker, Sandra	33
Bondi, Steven	20
Margraf, Zella	20
Hassler, Pamela	20
Morris, Kelly	3
DeRuiter, Garret	20
Griffin, Gary	20

Also available: SURVEY SET—composed of 3 examples of each professional member's work plus a slide of the person, when available. Housed in three 140-slide carousels. Rental fees: Professional, $6; Associate & Student, $20.

Also available: 13-minute film, with sound, documents and traces SNAG's development and growth. Rental fees: Professional, $3; Associate & Student, $8.

Address all inquiries to: Sandie Zilker, 1917 Welch, Houston, TX, 77019, 713/526-3030.

SNAG BOOK CLUB

SNAG BOOK CLUB ADDITION
by Betsy Douglas

I would like to add a book to our collection concerning metalsmiths in print, available at 30% discount from SNAG Book Club list. Please include: *Modern Jewelry–An International Survey* by Graham Hughes, Crown, $15.00.

If there are five interested members of SNAG who want copies of the book *The Technique of Jewelry* by Rod Edwards, I can place an order. Our single title order plan and Scribner requires a limit of five (5) copies to be eligible for their discount.

Write me at 4835 E. Cheryl Dr., Paradise Valley, AZ 85253.

GERMAN BOOK ADDITIONS
by Hannelore Gabriel

My recent visit to Germany resulted in some exciting additions to the book department's list of German literature.

In Pforzheim, at the Schmuck Museum, director Dr. Falk gave me a stack of catalogues which are listed below, the catalogue of the permanent collection and, in addition, catalogues of past and present exhibits.

The catalogues are very well designed, contain many photographs in black and white as well as in colour and are printed beautifully. On top of that they are very inexpensive, ranging from $1 to $4 (at this low price there is no discount though). Please add $1.50 postage for each three catalogues.

I spent another day at Ruehle-Diebener's, the publisher of European Jeweler and numerous books on metalsmithing, gemmology, and related subjects.

Ruehle-Diebener, who already generously had sent each SNAG member a copy of European Jeweler, made us a fantastic offer I hope we can't refuse: If we get 300 subscriptions together they would sell us the magazine for 50 percent off, which , including postage, works out to $30 a year.

Anybody who would like a subscription please give me your permanent address. I expect this gathering of addresses to take a while, but I want to set April 15, 1979 as the deadline for this. However, if you are definitely interested in this subscription, please let me know as soon as possible, so that I can determine whether we will be able to take advantage of this offer.

I also brought back a number of books on metalsmithing which are listed in this issue. Over the following months I plan to do more detailed reviews on them. I have found that German text books are much more detailed in technical aspects and are a worthwhile addition to our books. Besides — smart metalsmiths like us should have no trouble deciphering them!
(Editor's Note: Write Hannelore Gabriel, 1469 Rosena Ave., N. Madison, OH 44057.)

NEW LIST OF GERMAN BOOKS
(available at 30% SNAG discount)

Diebeners Monogramm Werk, monograms and decorations explanations in German, English, French and Spanish; 136 plates of exquisitely drawn monograms and alphabets; over 3000 motives; $143.00, $3 postage.

Gestaltungslehre, Hans Michael Heynen (basic design); 201 pages, 2200 illustrations; $43.00, $3 postage.

Die Kunst zu emaillieren, Prof. Walter Lochmueller; 94 pages, 14 colour plates; $18.00, $1.50 postage.

Der Junggoldschmied, Band I; Ein Lehrbuch fuer das Goldschmiedehandwerk; basic techniques, chains, stone setting, alloying, mechanisms; 191 pages, illustrated; $16.50, $1.50 postage.

Der Junggoldschmied, Band II; how-to of complicated techniques described on different pieces of jewelry; 272 pages, illustrated; $15.00, $1.50 postage.

Handbuch des Goldschmiedes, Band I; 52 pages of charts, like alloying, re-alloying of different coloured golds, silver and coin golds, Mohs" scale; $14.00, $1 postage.

Handbuch des Goldschmiedes, Band II; Ein Werkstattbuch fuer die Praxis; 192 pages about metallurgy, casting, soldering, melting; $15.00, $1.50 postage.

Handbuch des Goldschmieds, Band III; 373 pages with illustrations; specific working techniques, construction, stone setting, engraving, metal colouring, repairs; $21.00, $2 postage.

Werkstattrezepte fuer Graveure, Ziseleure, Guertler, Galvaniseure und Stempelhersteller, Heinz Hilpke; 125 pages; $14.00, $1.50 postage.

Das Edelsteinfassen, Walter Zeiss, (stone setting); 147 pages, illustrated; $15.00, $1.50 postage.

Tips fuer Verkaeufer, Gerhard Pinke, (tips for retailers); how to manage a jewelry store; 65 pages; $10.00, $1.50 postage.

Tabellen zur Edelsteinbestimmung, Pschichholz F.G.A., (charts for gem identification) in German and English; $19.00, $2 postage.

Welt der Mineralien; portfolio of 12 colour prints on strong paper suitable for framing, 12"x9½"; $17.00, $2 postage.

Praktische Gemmologie, Prof. Dr. W. Eppler; 410 pages, 4500 illustrations; $73.00, $2 postage.

Neuer Schmuck, Karl Schollmeyer Wasmuth; $49.00, $4 postage.

Schmuck, als kuenstlerische Aussage unserer Zeit, Dr. Gerhard Bott Schoener; $65.00, $4 postage.

(There is 30% discount on all books from Germany except for the catalogues from the Schmuck Museum. Please note the new postage rates; $1 per book has turned out not to be sufficient.)

Catalogues from the Schmuck Museum, Pforzheim
(no discount)

Schmuck aus dem Schmuckmuseum Pforzheim (catalogue of the permanent collection); 84 pages with 71 black/white photos and 16 whole page colour plates, mostly historical and some contemporary pieces of jewelry; $3.00.

Schmuck 73 Tendenzen; international exhibit of contemporary jewelry; 80 pages, 102 black/white photos; $2.50.

Schmuck 77 Tendenzen; international exhibit of contemporary jewelry; 100 pages, 80 black/white photos; $4.00.

Bezalel Jerusalem; exhibit of the Bezalel Akademy—Jerusalem Jewelry & Silversmithing Department; 56 pages with 68 black/white photos; text in German and English; $2.50.

Renaissance-Anhaenger (renaissance pendants); 30 pages with 18 black/white and 5 whole-page colour prints; $1.00.

Und wessen Hund bist Du? (And whose dog are you?); dog collars from 4 centuries; 48 pages with 26 black/white photos; $2.50.

Zierkaemme und ornamentaler Haarschmuck aus Japan (Okazaki collection of combs and ornamental hair pins); 40 pages, 29 black/white and 5 colour plates; $2.50.

(Please add $1.50 postage for each three catalogues.

FEATURE ARTICLES

PFORZHEIM – PERSONAL EXPERIENCES IN THE "GOLD CITY"

by Alan Revere

(top) Downtown Pforzheim –photo by Stadtinformation Pforzheim

(middle) Professor Reinhold Reiling leading discussion of student work in his jewelry design class –photo by Gunter Meyer

(bottom) Schmuckmuseum Pforzheim

During the recent conference in St. Louis, as on numerous other occasions, I was asked about Pforzheim, West Germany. Between 1972 and 1974, I lived, studied, and worked in what is called the "Gold City" of Europe. Pforzheim, as a major international jewelry center, plays an essential role in the production of jewelry for worldwide markets and in the training of goldsmiths who will work in almost every country on earth.

With a population of 100,000, Pforzheim is located in southwestern Germany's Black Forest region. Pforzheim, a name originally given by the Romans, means "door to the Black Forest." Although a few older buildings remain today, the city has the appearance of many other modern post-war areas of Germany. Pforzheim is situated between Karlsruhe and Stuttgart, with the French border only 45 minutes away – just close enough for the serious lunchtime gourmet.

The jewelry industry was introduced in the 18th century by a baron seeking a trade for the local people. Today, 30,000 employees are maintained by the 800 jewelry and watch making firms. Pforzheim produces approximately 75% of Germany's jewelry as well as supplying merchants around the globe. The firms range in size from one-man operations to large companies employing several hundred. Their products include inexpensive silver and gold filled jewelry, production gold jewelry, fine diamond jewelry, and art jewelry.

The training of Pforzheim's tradesmen is a well organized and highly regarded system. There are three schools and a variety of apprenticeship positions. The schools are subsidized and supervised by the jewelry industry and there is no tuition. Pforzheim's most famous school is the Fachhochschule fur Gestaltung (College of Design). Established over 100 years ago as the Kunst und Werkschule (Arts and Crafts School), it offers a 5-year program leading toward a master designer's credential in the following areas: industrial design, fashion design, graphic design, jewelry design and production jewelry design. Entrance to the regular program requires the equivalent of a junior college degree. A knowledge of the German language is now essential. Many students in the jewelry programs are already credentialed goldsmiths and master goldsmiths before they embark on the study of jewelry design. The program offers students a thorough training in the technical aspects of the goldsmithing arts taught by superior master craftsmen and an opportunity to study design with some of Germany's most respected jewelry designers. Although most students enroll in the regular program, there are a few spaces for independent (nonmatriculating) students. The student body includes the sons and daughters of goldsmiths and jewelers from around the world. The following is a list of the courses offered in the jewelry programs at the Fachhochschule fur Gestaltung: Jewelry Design, Gemology, Photography, Stone Setting, Lapidary, Engraving, Enamelling, Repousse, Model Making, Chemistry, Materials and Electronics, Physics and Tool Theory, Goldsmithing–Small Forms and Jewelry, Production Techniques, Silversmithing–Large Hollow Forms, Metal Spinning, Electroplating and Electroforming, Still Life Drawing, Industrial Jewelry Design.

Directing the jewelry programs at the school are two of Germany's top designers, Professor Klaus Ullrich and Professor Reinhold Reiling (himself a graduate of the school). Ralph Turner, in his book *Contemporary Jewelry*, summarizes the impact this school has had by stating that the Fachhochschule fur Gestaltung has "probably produced more creative jewellers than any equivalent anywhere else in the world."

The Goldschmiedeschule Pforzheim (Goldsmith's School), is an autonomous jewelry academy dedicated to the preparation of young goldsmiths following a training program passed down from the guild system. The international student body is younger than that of the Fachhochschule fur Gestaltung with a large group in their teens. The study program is rigid, including the same types of classes listed above, however, with little emphasis on creativity or design. Students can choose from two programs. The larger program is a work-study combination. In this arrangement, the student works as an apprentice goldsmith while taking a few classes each week for 3½ years. The second program involves full-time study for two years followed by 12-18 months of full-time apprenticeship. At the end of the program, the applicant is examined rigorously in theoretical and practical knowledge before becoming a credentialed goldsmith.

Five years of experience qualifies a goldsmith to enter a one-year "master's course" in which he will learn practical business and management skills including goldsmithing law, Germany trade standards and accounting. The jewelry industry in Germany is largely supervised by the individual master goldsmiths and is dependent on them for the maintenance of trade standards. Master goldsmiths are given special privileges and responsibilities. Each firm which employs goldsmiths must have a master as the foreman. Master goldsmiths are the only ones permitted by law to train apprentice and student goldsmiths. At the end of the master's course, the goldsmiths are tested for theoretical and practical ability. Each candidate then submits three original designs and allowed 200 supervised hours to execute his "masterpiece." Because of these high standards, German goldsmiths and master goldsmiths are respected for fine craftsmanship around the world.

Pforzheim's third professional school is the Watchmaker's School. Similar in content and goals to the Goldsmith's School, this academy is devoted to the training of craftsmen for the local watchmaking industry. Courses and apprenticeships are geared toward watchmaking, clockmaking and repair.

Complimenting the schools and manufacturers is the world's only museum devoted to the art of jewelry forms. The Schmuckmuseum Pforzheim (pronounced shmook, rhyming with book and meaning adornment), is directed by Dr. Fritz Falk. It houses an immensely diversified array of jewelry forms spanning 4,000 years. The museum has notable collections of Roman jewelry, gold rings, medieval and renaissance jewelry, art nouveau and deco styles, industrial jewelry and art jewelry. The museum sponsors exhibitions of international importance such as the triennial invitational called "Tendenzen" (meaning tendencies or trends). There is another little known museum house housed in a small church on the other side of Pforzheim. Herein lies a magnificently restored goldsmithing workshop from 1860, complete with rolling mills, forge, treadle operated polishing machine and a five man workbench.

Supplying the industrial needs of the jewelry and watch manufacturers is the most concentrated and extensive array of metal, stone and tool companies anywhere. Several large refineries provide precious metals in huge quantities and varieties of alloys, sizes and shapes. A dozen tool supply companies offer large assortments of the finest quality hand tools, machines and equipment for which Germany is famous. Several gem dealers, 40 diamond houses, and an assortment of small specialty companies offer the jewelry industry every imaginable product relevant to jewelry production.

I first heard about Profzheim while studying toward a Master of Fine Arts degree at the Instituto Allende in Mexico. I corresponded in German with the help of a friend, and was accepted to enter the jewelry program at the Fachhochschule fur Gestaltung in 1972. My wife and I packed our belongings and our Mexican collie and boarded a plane with one way tickets to Frankfurt.

Much to everyone's surprise, when I attempted to enroll, I discovered that a knowledge of the German language was required, and they learned that it was not I who had written them in beautifully perfect German. After a lot of hassles, we reached an agreement and I began classes immediately. I was scheduled to take jewelry design for two days each week with Professor Reiling, goldsmithing for two days with Pforzheim's head master goldsmith, and the last day was split between stone setting and engraving. Motivation and experience with other languages helped me to learn German quickly, and after a few months I could survive without my translating school friends. I was in heaven. Pforzheim is like Mecca for a serious goldsmithing devotee, which I was. My classes consumed about 45 hours a week, plus homework. The quality and competence of my instructors was all that I had hoped for. My goldsmithing professor, who recently retired after a celebrated 50-year career, was very patient about my persistent questions. I was able, as an independent student, to pick and choose from several hundred goldsmithing projects, and learned to fabricate delicate hinges, chains, catches, rings,brooches, and movements which I had never seen before. At school, I made well over a hundred of the projects, and have expanded upon them as the foundation for the private instruction which I now offer in traditional goldsmithing techniques.

I began to work part-time in addition to continuing my studies. I proceeded from production benchwork through model making for a manufacturer and freelance designing for firms. My goal at the time was to work in the studio of Klaus Ullrich. After several attempts, he accepted me and I gladly took a 50% cut in wages for the experience of working with him on his exquisite one-of-a-kind designs. Two years after arriving in Pforzheim, I had gathered a thorough knowledge of goldsmithing and allied techniques and was well on my way toward developing an individual expression of my concepts in jewelry forms. In Pforzheim I established a deep personal commitment toward renewing the high standards of professional integrity and craftsmanship which still prevail in the "Gold City."

SCHOOLS: Fachhochschule fur Gestaltung, 7530 Pforzheim, Holzgartenstrasse 36, West Germany; Goldschmiedeschule Pforzheim, 7530 Pforzheim, St. Georgensteige 65, West Germany.

MAGAZINES: Goldschmiede Zeitung, AD BAG, 90 Park Aven., Suite 2N, New York, NY 10016; Gold und Silber, Trade Media International Corp., 426 Madison Ave., New York, NY 10017.

MUSEUM: Schmuckmuseum Pforzheim, 7530 Pforzheim, Jahnstrasse 42, West Germany.

ORGANIZATION: International Society of Friends of the Schmuckmuseum Pforzheim, Ida Boelen van Gelder, Secretary, Amsterdam Z Holland, Postfach 70028.

CITY INFORMATION: Stadtinformation-Verkehrsverein, 7530 Pforzheim, Ostliche 2, West Germany.

CRAFTS IN CHINA

by Judith Kahan

(Editor's Note: On Nov. 3, 1977, the U.S. Crafters and Artists Delegation—20 people from 10 states—assembled in VanCouver, Canada to depart for the People's Republic of China. Ms. Judith Kahan, a New Jersey jeweler and the leader of the delegation, believes that this was the first delegation of American artists and crafters to visit the People's Republic of China. As all groups that visit China the delegation visited communes, hospitals, residential neighborhood centers and such tourist sites as the Forbidden City, the Ming Tombs, and the Great Wall. As a delegation of artists and craftsmen, the major emphasis was on visiting art institutions and craft factories. The itinerary was Peking, Tsinan, Soochow, Nanking, Shanghai and Canton.)

Historically China has always made a distinction between the arts of painting, poetry and calligraphy and the ancillary arts of potting, ivory and jade cutting, jewelry and lacquer carving. There are thousands of known Chinese artists; few known crafters. This article is concerned with the crafter, the practitioner of the minor arts in the People's Republic of China.

To understand the crafts in modern China one must comprehend the historical position of the artisan. The Chinese crafter has traditionally worked in a factory. In 1680, the Emperor K'ang Hsi established 27 craft factories in his Palace in Peking. During the Ming Dynasty there were imperial weaving factories in Hangchow and Soochow. A Bureau to carve ivory and rhinoceros horn for the imperial household existed in the thirteenth century.

As Europe had their guilds and ateliers, so China had there workshops. It was only in these situations that a monumental art could be created for a royalty. Certainly no individual could create the elaborate and enormous vases in the Forbidden City or the equestrian bronzes and terra cottas found recently. Such creations could only be conceived and manufactured within the specialized breakdown of a factory.

There should be no romantic misconceptions that within these factories existed a hereditary line of craftsmen transmitting secrets from father to son. On the contrary, poverty stricken parents usually indentured their 8 to 12-year-old children to owners of small workshops. For the privilege of learning a craft they received room, board, and no compensation for three to four years. Although today the artisan has been elevated to new status in China, the method of production remains the same. Numerous persons still work on one piece. Every aspect of production is segmentalized. Pere D'Entrecolle, in a letter to his friend Pere Orry on Sept. 1, 1712, described how a piece of pottery would pass through "the hands of seventy workmen" prior to completion. There is and always was a division of labor: designers, sawyers, carvers, polishers, etc. All work in anonymity. If a piece is outstanding and designated for exhibition, it receives the seal of the factory. It is in this atmosphere of anonymity and departmentalizing that some of the greatest crafts have been produced.

During my visits in 1976 and 1977 to the Peking Arts and Crafts Factory, I observed the cloisonne workers. One person designs the piece, someone else makes the copper bowl, another in a different part of the factory puts on the cloisonnes, still another packs the enamels, someone else fires and so on.

Cloisonne was introduced into China from Persia in the early 1300's. It was often referred to as the inlay work of the devil's country and never received the high acclaim within China that it enjoyed beyond the Great Wall. In 1387, Tsao Ch'ao stated: "We have seen urns for burning incense, vases for flowers, round boxes with covers, wine cups and the like, but they are fit for use in the ladies' apartments, being too gaudy for the libraries of scholars of simple taste." Despite a lack of acceptance of cloisonne during its initial introduction into China, it reached its height of artistic accomplishment during the Ming Dynasty, 1368-1644.

During the latter part of the Ching Dynasty, 1644-1912, the courts stopped patronizing the arts. It was during this period that the cloisonne worker not only sought out the foreigners and the rich as possible new patrons, but was forced to experiment in an endeavor to cut costs. The main innovation of this period was the introduction of the draw plate, which made possible the standardizing of the size of the copper cloisonne. Another major contribution made during this era was the introduction of a vegetable adhesive which burned out during the fire process. By keeping the cloisonne in place with this substance, the use of solder was eliminated. Solder, which had been used during the Ming Dynasty had caused pitting.

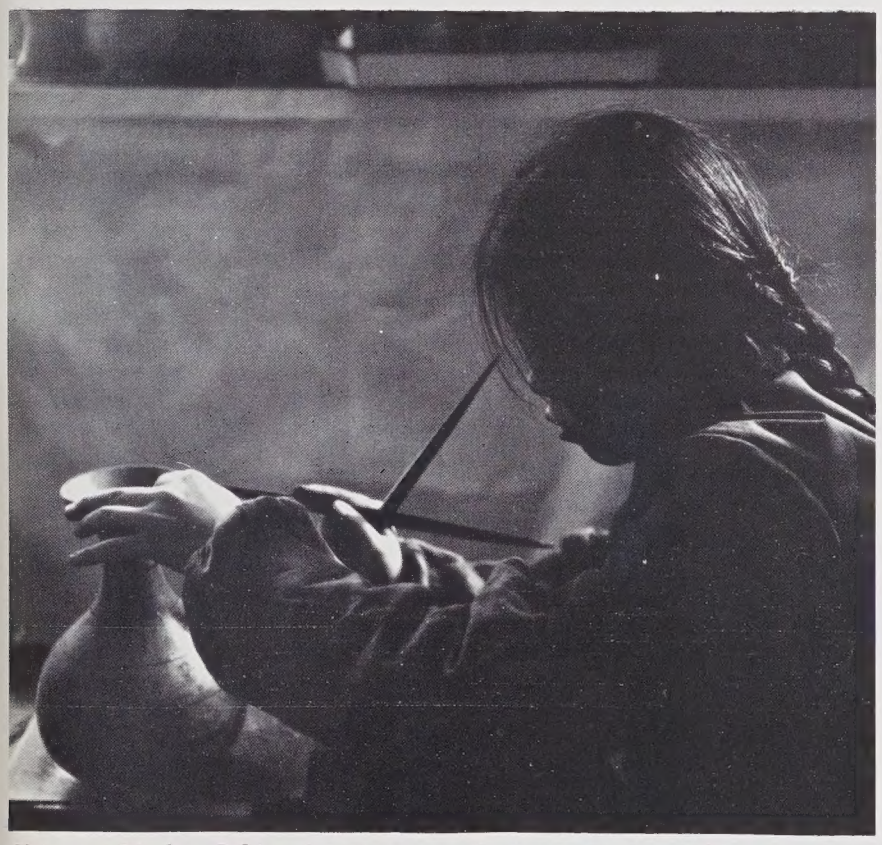
The U.S. Crafters and Artists Delegation presented enamels and Klyre Fire to the Peking Arts and Crafts Factory. One of the young ladies tried to put the cloisonne on a copper bowl with Klyre Fire. The cloisonne hung precariously on the bowl. Then she dipped the cloisonne into a brown herbal substance. It was amazing; the cloisonne stuck to the bowl within five seconds after it was applied. It was extremely difficult to remove. The young lady shook the cloisonne with her tweezers and still it adhered to the bowl. Because of this substance the Chinese are able to lay cloisonne on enormous pieces over a period of a year or two. We have brought back some of this substance which we are arranging to have analyzed. Upon visiting the room where they packed enamels, we were surprised to find that the Chinese do not use brushes. They use packing tools and a variety of different size eye droppers. In this way they seem to better control the packing of enamels.

We discussed the segmentalizing of craft production in the People's Republic of China with Chang Tung Lu, head of the revolutionary committee (administration) of the Peking Arts and Crafts Factory. Mr. Chang stated, "Different countries have adopted different methods of doing the crafts." Mr. Chang, formerly a cloisonne worker and now a designer, said, "We think it is better to do part of the cloisonne work." Mr. Chang felt it would be psychologically exhausting to assume complete responsibility for the designing as well as the completion of a piece.

Mr. Hai, of the Shihwan Procelain Factory, as Mr. Chang, is content to be a designer. He envisioned himself as making a "collective contribution." He explained that each worker makes their own tools and each tool has a specific use which must be mastered. How, he questioned, could one use tools made by another? To be a master craftsman, or a veteran worker as the Chinese say, is to master the use of one's tools which have a specific use. The making of the copper shape naturally requires skills and tools different than those needed to applying cloisonnes. Mr. Hai also pointed out that departmentalizing lends itself to mass production. In numerous factories visited, most of the work being done was for export. China has always had a large export art industry. She has been setting the tables of emperors, kings and those beyond the Great Wall for centuries.

How are visual controls maintained with so many contributing to the manufacture of one piece? The veteran worker is the key link to the successful completion of a project. It is he or she that is the teacher and in effect the project director. As one walks through a craft factory one finds the veteran worker sitting among the crafters supervising production. He works directly on a project with the artisans. In the Sandalwood Fan Factory in Soochow, Ma Chin Sheng was directing six workers in the making of an ivory bird cage which will take approximately a half year to complete. In the Embroidery Research Institute in Soochow we observed five persons simultaneously embroidering a canvas of Chairman Hua and Mao which reflected the visual control of one master.

Master Cloisonne Craftsman, working on large vase over a two-year period
–photo by Walter Licht



Cloisonne Worker, Peking Arts & Crafts Factory
–photo by Leonard Kahan

Cloisonne Worker, Peking Arts & Crafts Factory
–photo by Leonard Kahan

It is in the treatment of the craftsmen and their working conditions that the most dramatic change has occurred. Under the old regime, once the crafter completed his apprenticeship he was entitled to receive wages. Often at this point in his career he was fired, only to be hired from time to time as a specialist. This treatment resulted in the jealous guarding of trade secrets.

Rose Leibrand described the incredibly horrible conditions under which weavers were employed in her article in *The China Journal*, "The Peking Rug Industry," in 1932.

> "Apprentices, during the time of their contracts, are bound to the will of their employers. They live and work in tiny ill-ventilated rooms, sleeping on wadded bedding on the floor and eating the frugal meals with the weavers . . . The mortality amongst rug weavers is high, due to the carpet lint which they breathe into their lungs, so that graduated apprentices are always needed to take their places."

Lu Hsiao Suan, filigree master craftsman of the Peking Arts and Crafts Factory, is 52-years-old and has worked as a jeweler for 40 years. He described what it was like to be an artisan prior to the revolution. Mr. Lu became a jeweler for a very unromantic reason: there was no other job available. He went to work in a small workshop for three years. In return he received two meals a day and lodging. He received no compensation and labored from dawn to dusk. "Mostly I did housework for the owner of the workshop during the first two years," he said. It was only in the third year that he began to learn jeweling.

Today the highest paid worker in every craft factory is the veteran. He is shown the greatest respect and for the first time in history has been provided with something he never had: job security.

In the early 1950's, shortly after the revolution, craft cooperatives were formed. As the crafts were dying under the Kuomintang, the new government sought out the few remaining veteran craftsmen and brought them out of retirement. It was in these new settings that the master craftsman was elevated to the position of educator. Assured of his new value within the society, the veteran worker today oversees production of factories that employ hundreds of artisans. He is permitted and encouraged to create spectacular works of art for government exhibition. He is completely freed of all commercial involvement. He neither purchases the raw material nor sells the final product. He spends eight hours a day working at his craft.

China is producing great technical craftsmen. After graduating from middle school at about 17 years of age, those with some art talent are assigned to work in a craft factory. One is apprenticed to a veteran worker for three years and trained only by the best – the master craftsman. Mediocrity is avoided: "beginning" and "second level" teachers are non-existent. The results are spectacular. From the beginning the particular talent of the apprentice is known to the veteran worker. After training the new craftsman is assigned to one aspect of the production and seldom changes jobs. Thus the process of segmentalizing is institutionalized. If the person is very talented and can do designing, after the craft training, he might be enrolled at an art institute to learn "creative work".

In the United States "innovation" and being "avant garde" are the key to the arts. This is not true in the People's Republic of China now, nor has it ever been true. China is a nation steeped in tradition. The emphasis is on preserving the artistic past, which is done by copying. It is this constant imitating which is most shocking to Westerners. Nevertheless, the Chinese have been copying each other for centuries. Tao Lu in 1815 in *Ching Te Chen*, his celebrated book on Chinese pottery, provides us with a fascinating list entitled "workmen have their creations." This list provides us with each type of creation possible within the pottery shop. Some of the types of creations include: "official old, superior old, rough imitation, foreign and pieces to order." Innovation is not the key to Chinese art; refinement through reflection is.

Kendrick, in his article "Textiles" in *Chinese Art*, summarizes the other reasons for the slow historical change in Chinese art styles:

"The dislike of the Chinese for innovation is not the sole cause. The motives and even the colours, they used were closely linked with their philosophic and religious beliefs, and the craftsman was not at liberty to select them at random. Ornaments were tabulated into series with their appropriate uses, and colours used on one occasion were not admissible on another. Some were reserved for the imperial factory alone; others were prerogative of the higher nobility, and so on through a score or more of stages."

Nevertheless, as one looks over the history of Chinese Art, there has been change and numerous styles, but change takes longer when copying rather than innovating is emphasized. The concern for innovation today in China is of a technical nature.

Finally, one cannot overlook what has been done for women in the new society. Prior to the revolution, except in embroidery and silk weaving and some aspects of pottery, there were no women crafters. Women were bound to the house. Their sole role was domestic. Yeh Peng Chin, in his article "Miniature Pictures in Tiny Bottles" in *China Reconstructs*, describes how one would not even teach one's daughter how to paint inside snuff bottles, one of the few crafts that had been handed down from generation to generation. The reason was that, through marriage, one would be robbed of their "rice bowl." Not only were women not taught the crafts, but there was a need to limit the number of crafters so that those with the knowledge and skills could earn enough to eat.

Today the secure master craftsmen are teaching women the crafts. Sixty percent of the staff of the Peking Arts and Crafts Factory are female. Women run some factories and prestigious art institutions. Women head the revolutionary committees of the Peking Glass Factory and the Shanghai Music Conservatory (which wins international competitions) and the May 7th Art School in Tsinan. The head of the Soochow Embroidery Research Institute, a woman, was one of the few persons we met in China who had recently travelled abroad.

When we look at the crafts in the People's Republic of China, we see both great craftsmanship and departmentalizing. Yet it is only recently that the artisans in the United States have gained recognition as individuals and even more recently as artists. Many of our great quilts were made by women anonymously. Glass making until recently has always been segmentalized, one making the stem and another the cup, and so forth. Most nations have sub-divided the production of pottery. The great Renaissance painting guilds had their masters and their apprentices. This is not an attempt to compare China to the U.S.; they are not comparable. The point is that China's approach is not as foreign to the Western way of thinking as might appear on first viewing.

Of course there is no comparison between the Chinese artisan's sense of obligation to "serving" and ours to innovating. We are two very different countries. We are a highly industrialized nation committed to the principles of free enterprise and individualism. China is a socialist country; an agricultural nation that has made its priorities feeding, clothing, educating and providing medical care to nearly a billion people.

As we are busy innovating and inventing, China is stating that "art should serve politics." Their theme is "socialist content and traditional technique." Craftsmen are expected to study Marx, Lenin and Mao Tse Tung. One is expected to maintain close contact with the working class. Designers and master craftsmen are permitted and encouraged to make trips at factory expense to visit peasants and workers in order to be inspired in their production of the arts.

Judith Kahan with translator

Art cannot be separated from politics in the P.R.C. Both the major and the minor arts are employed in building socialism. The society needs the artist to help revolutionalize the masses. The city of Shanghai is covered with original oil paintings emphasizing revolutionary themes.

Although the Chinese are producing a revolutionary art glorifying the role of the peasant and the worker, traditional design has received new recognition in modern China.

We arrived in China to find a great controversy raging in the arts. During the Cultural Revolution many with "bourgeois" training were sent to the farm. Since the downfall of the Gang of Four, headed by Mao's widow, many previously in disfavor have returned to their former positions in the art and academic worlds. The Gang of Four discouraged traditional Chinese design, as it represented a more decadent period in China's history. This is no longer true.

China has taken a step forward by reviving her past. As her painters copy in confident emulation, so her crafters look at their past heritage to bring forth with great competency new creations.

Most important of all, what has changed most in the People's Republic of China is that the artist is now given recognition as an important member of society, with all the rights and guarantees given every citizen of the People's Republic of China. His quality of life has improved dramatically. As the society serves him, he — with great enthusiasm — serves the society.

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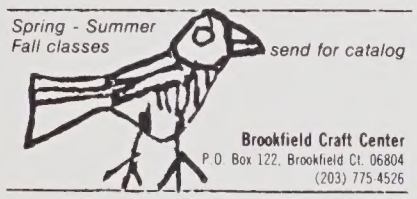

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